This is a digital copy of a book that was preserved for generations on library shelves before it was carefully scanned by Google as part of a project to make the world's books discoverable online.

It has survived long enough for the copyright to expire and the book to enter the public domain. A public domain book is one that was never subject to copyright or whose legal copyright term has expired. Whether a book is in the public domain may vary country to country. Public domain books are our gateways to the past, representing a wealth of history, culture and knowledge that's often difficult to discover.

Marks, notations and other marginalia present in the original volume will appear in this file - a reminder of this book's long journey from the publisher to a library and finally to you.

Usage guidelines

Google is proud to partner with libraries to digitize public domain materials and make them widely accessible. Public domain books belong to the public and we are merely their custodians. Nevertheless, this work is expensive, so in order to keep providing this resource, we have taken steps to prevent abuse by commercial parties, including placing technical restrictions on automated querying.

We also ask that you:

+ *Make non-commercial use of the files* We designed Google Book Search for use by individuals, and we request that you use these files for personal, non-commercial purposes.

+ *Refrain from automated querying* Do not send automated queries of any sort to Google's system: If you are conducting research on machine translation, optical character recognition or other areas where access to a large amount of text is helpful, please contact us. We encourage the use of public domain materials for these purposes and may be able to help.

+ *Maintain attribution* The Google "watermark" you see on each file is essential for informing people about this project and helping them find additional materials through Google Book Search. Please do not remove it.

+ *Keep it legal* Whatever your use, remember that you are responsible for ensuring that what you are doing is legal. Do not assume that just because we believe a book is in the public domain for users in the United States, that the work is also in the public domain for users in other countries. Whether a book is still in copyright varies from country to country, and we can't offer guidance on whether any specific use of any specific book is allowed. Please do not assume that a book's appearance in Google Book Search means it can be used in any manner anywhere in the world. Copyright infringement liability can be quite severe.

About Google Book Search

Google's mission is to organize the world's information and to make it universally accessible and useful. Google Book Search helps readers discover the world's books while helping authors and publishers reach new audiences. You can search through the full text of this book on the web at `http://books.google.com/`

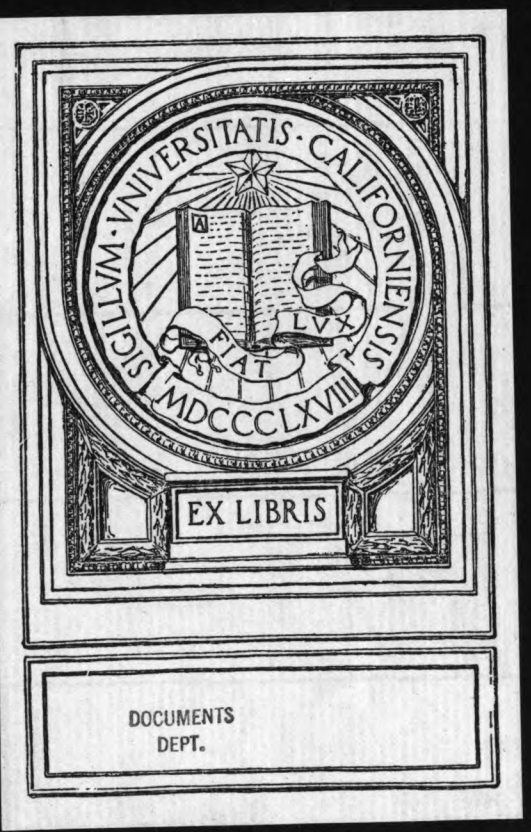
HD
8053
N5A4
1914/15

DOCUMENTS
DEPT.

UC-NRLF

B 3 422 345

Digitized by Google



DOCUMENTS
DEPT.

State of New Jersey

REPORT

OF THE

Department of Labor

1915

SINNICKSON CHEW & SONS COMPANY, PRINTERS
CAMDEN, NEW JERSEY
1916

Digitized by Google

HD8053
N5A4
1914/15
DOCUMENTS
DEPT.

Digitized by Google

ANNUAL REPORT

Trenton, N. J., October 31, 1915.

HON. JAMES F. FIELDER, *Governor,*
State of New Jersey.

SIR:

In presenting a report covering the wide range of its activities during the past twelve months, the Department of Labor includes a record of its entry into the practically new field of standardization of the enforcement of Labor Laws. That this is destined to facilitate the achievement of uniform requirements for the protection of the worker, not only in New Jersey but in other States as well, has already been widely recognized. Probably no greater handicap to social and industrial reform exists to-day, than the feeling of uncertainty everywhere engendered by tentative, experimental, and conflicting labor regulations. During the past decade there has necessarily been much difficulty throughout the country in adjusting new State requirements, covering the safety of employes, to the practical necessities of allied manufacturing interests. While the conviction is deepening that there is no real antagonism between the fundamentals of business efficiency and industrial hygiene, there is, nevertheless an increasing demand for a more scientific spirit on the part of those to whom is entrusted the enforcement of laws affecting both employer and employe.

It is cause for satisfaction that in our own State the work of the Department is being consistently aided by progressive manufacturers. Co-operation, rather than antagonism, has resulted from the recognition of the fact that conscientious effort is made to achieve desired results without injury to the best interests of any.

Believing that the welfare of the worker is only conserved by rational reforms, based on a scientific system of trade investigation, the Department is standardizing all phases of its activities in the light of its wide industrial experience. During the past year it has based its orders for safeguarding, structural changes, and mechanical and sanitary improvements (as well as for general

734921

Digitized by Google

hygienic working conditions) on uniform requirements. In so far as has been possible, it has investigated and covered simultaneously in its recommendations all the plants in allied groups of industries. For the special trade-reports necessitated by this method, it has called in the services of the best experts obtainable; who, by co-operation with those of the Department, have collected some of the most authentic trade hygiene data now existing in this country. The thoroughness of its research work, along mechanical and sanitary lines, has won recognition not only in this but also in other States.

There is no longer question as to the satisfactory results arising from such methods of promoting trade co-operation in safety and sanitary reforms. For years the Department has been convinced that an arbitrary enforcement of regulations, to which acceptance was refused by individual or allied employers, brought little lasting good. Our present system not only assures the discharge of our full duty to the half million workers of the State, but also conserves the interests of New Jersey's many manufacturers, whose enterprise and ability have built up the extraordinary range of industry existing within our borders. Moreover, it is developing a feeling of confidence in the permanent character of the improvements required by the Department; and demonstrating that, having passed the experimental stage, we can achieve the desired results not only with certainty, but with due economic safety to the business interests concerned. For this reason the records of the past twelve months show uniform and steady improvement in diverse types of working conditions, which are based on the standardized essentials of ventilation, light and general sanitation. This is especially noteworthy in the case of those trades making demands upon the physique of their workers: trades scientifically listed as Extra Hazardous, Hazardous and Sub-hazardous.

While it is impossible to cover, in the necessarily limited space of a report, all phases of the highly specialized activities of the Department, the work for 1914-1915 falls naturally into certain broad divisions. These include not only the enforcement of our labor laws, but also record the various types of work accomplished in the diverse fields assigned to our regular Inspecting force and our staff of Experts. In addition, specific data is given as to the standardization already achieved, dealing with the subject of fire-protection; the publication of a Bulletin on the Felt Hatting

Digitized by Google

Industry; a pamphlet on the Safeguarding of Transmission Machinery; an Iron Foundry Bulletin now in course of preparation; and a variety of special trade investigations, summaries of which only await opportunity for publication.

FIRE PROTECTION AND FACTORY CHIEF MOVEMENT

In considering the various matters which command the attention of the Department of Labor, it is possible to underestimate the importance of proper and adequate regulations for the protection of factory operatives from the fire hazard. The recent fires which have occurred in adjacent States are eloquent arguments against laxity or indifference in the enforcement of the safeguards contemplated by statute. It is gratifying to know that New Jersey has been generally recognized as the pioneer in the matter of complete fire regulations. The present program of the Department is the direct result of the disastrous fire which occured in the city of Newark in the year 1910; which, in addition to a large number of fires within our own State, and more recent fires in other States, completely justify the drastic regulations set forth in our laws.

ALARMS—Our provisions include the notifying promptly of the occupants by means of an electrical alarm system; the provision of safe and adequate means of egress; and the organization and frequent practicing of fire drills. The electrical alarm system specified by this Department has been recommended for acceptance by the Signal Committee of the National Fire Protection Association, with practically no alterations. It has thus become the standard for general factory use throughout the country.

EGRESS—The methods of egress in vogue in New Jersey consist of inside stairways, and of towers or outside escapes. In new buildings we insist upon an absolutely fire-proof enclosure for all stairways leading from the foundation to and through the roof; while the entrances must be protected by standard Underwriters' fire doors. The erection of smoke-proof towers, with outside entrances, is also encouraged by the Department. In all cases where possible, we believe that stairways should open directly to the outer air on the ground floor. The outside type of fire escape specified by the Department is capable of convenient use; and its

Digitized by Google

safety is materially increased by the fact that all entrances are made by doors cut down to the level of the floor; and that these doors (together with all the windows opening upon all escapes) must be of fire-proof construction. Under this method, a safety zone is established so that those using the fire escape are protected from the flames and smoke, which would otherwise create a hazard.

FIRE-PROOFING—A close study of factory fires, indicates the necessity for enclosing the stairways in all factory buildings. The Department has previously accepted an enclosure consisting of two thicknesses of one-inch tongued and grooved boards, laid diagonally in opposite directions, and with a sheet of asbestos between; or a one-inch thickness of boards with the exposed side covered with tin or other suitable sheet metal.

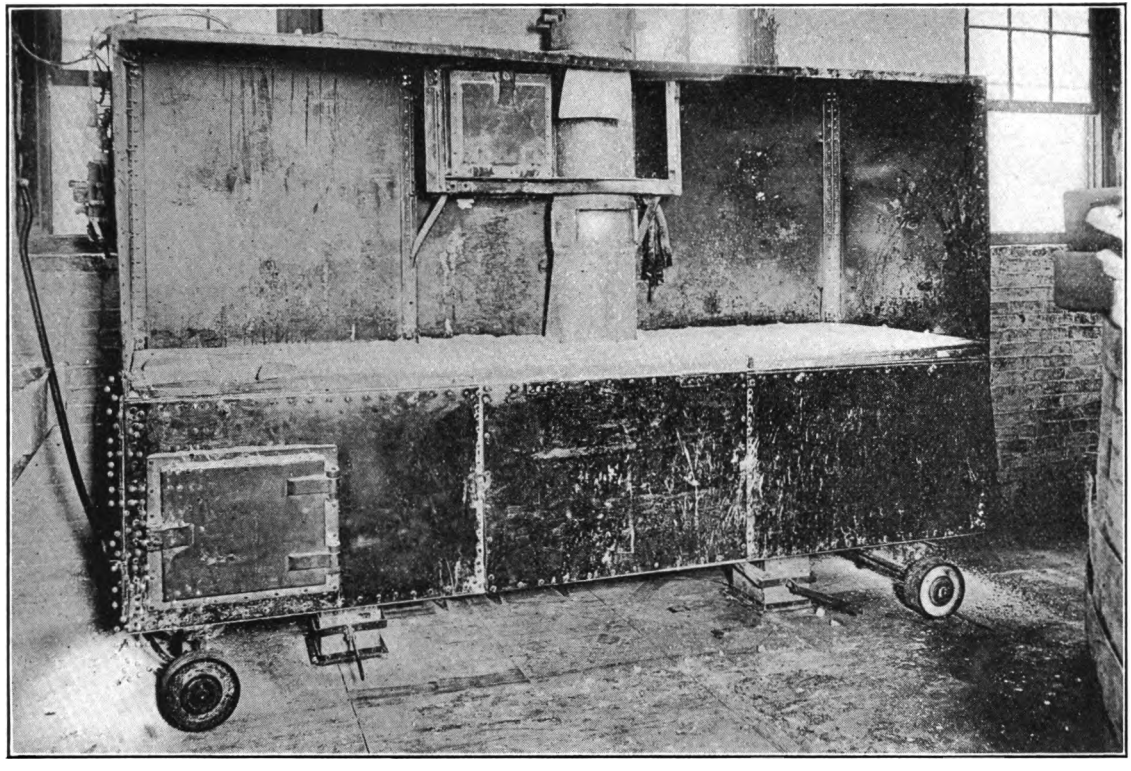
The orders of the Department for this type of construction, which has hitherto been accepted as the minimum requirement for buildings where the hazard is not too great, are about to be improved. Inasmuch as a committee of the National Fire Protection Association is making a thorough investigation, and conducting practical tests as to the best type of stair enclosure to recommend, we have, therefore, thought it advisable to withhold definite specifications until after the report is concluded.

All openings through floors, such as stairwells or elevators, create a positive danger, and our inspections are leading up to the point where all openings of this character will either be fully enclosed, or otherwise suitably protected.

DRILLS—The question of fire drills is one of very great importance, and recurring fires in buildings occupied by a number of operatives give additional evidence of their usefulness. Factory operatives should be made familiar with the means of egress provided, and should be taught to leave the building promptly and in an orderly manner in the event of fire.

On the day designated by the Governor as "Fire Prevention Day," the Department issued a request to a number of manufacturers of the State to practice fire drills, and we have received a large number of letters from firms, indicating the success of such drills, and also the operation of their fire brigades. The responses and excellent results obtained were encouraging to the Department, and indicate a splendid spirit of co-operation on the part of

Digitized by Google



Knocking China-ware. Workers using this machine are protected from dust by means of a mechanical exhaust dust control system.

Digitized by Google

UNIV OF
CALIFORNIA

Digitized by Google

the manufacturers. Some critics of fire drills maintain that while they are capable of successful demonstration under ordinary conditions, they fail under the stress of actual fire. This contention, however, has not been borne out by experience. We have had a number of fires within the State, during which the program of electrical alarm equipment and fire drills, and the organization of fire brigades, has been fully vindicated.

PREVENTION—The question of fire protection, while of greatest importance, should be considered in conjunction with its equally important adjunct, fire prevention. This fact is fully recognized by the Department, and every effort has been made to impress upon the owners of factories the necessity for conducting their plants in a manner least calculated to occasion fires.

FACTORY CHIEFS—The work has been wonderfully facilitated by the organization of the Factory Chief movement, which consists of the designation by the employer of a responsible assistant to act in the capacity of Factory Chief. A book of instructions as to preventive precautions is issued by the Department, and meetings are held for the benefit of the Factory Chiefs. Literature bearing upon the work is also mailed to them. The general oversight of the fire fighting apparatus, to be assigned for the fire drills, is placed within their jurisdiction; and they are also instructed in the elements of good factory housekeeping. Special stress is laid upon the necessity for the careful storage of any explosive or inflammable materials; the gathering up of loose waste; the handling of oily waste; and the best method of removing hot ashes.

The Factory Chief movement has proved a complete success, and we now look upon this body of men, who are 1,135 in number, as a splendid auxiliary force of inspectors, who are constantly on the premises for the purpose of carrying out the instructions of the Department. They are impressed with the fact that they are serving not only their employers and the State, but also their fellow-workmen; for the reason that their activities may be the means of preventing suffering and loss of life in the event of fire, and the financial loss occasioned thereby.

BRIGADES—The operatives of the plant are organized into fire brigades, varying from a few men equipped with fire extinguish-

Digitized by Google

ers, buckets of water, sand, and fire hose, to thoroughly organized and equipped departments. An effort is made to impress the operatives with the fact that each one has a specific duty to perform in the event of fire, and in some cases remarkable efficiency is developed. In one factory, three distinct lines of three-inch hose, each connected with a fire plug leading to a fire pump, can be carried to the fourth story of the factory in less than one minute from the time the alarm is sounded; and a small interior hose, located at each seventy-five feet of floor space throughout the building, can also be ready for action within that time. In another factory, twenty-six fire extinguishers can be brought to the portion of the building from which the alarm is sounded within one minute of the time the alarm is given.

We have records of a number of fires which have been extinguished by the local fire brigades before the paid Fire Department reached the building. We feel, however, that it should be a part of the factory fire drill regulations to notify promptly the city departments of the existence of a fire, for the reason that time is sometimes lost by a factory fire brigade attempting to handle a fire of too large proportions. Under our fire drill regulations, it is made the duty of some specified person to notify the local fire department of the existence of a fire, which should be done by calling up on the telephone the fire headquarters, and transmitting an alarm from the nearest city box. A card is furnished by the Department for the purpose of posting adjacent to the telephone, and on this is written the telephone number of the fire department which is to be called.

The work of the Factory Chiefs in the matter of fire prevention has been so satisfactory that their activities have been extended to include the safeguarding of machinery, elevators, and other hazards throughout factory buildings. The recent pamphlet issued by the Department on machinery safeguarding was mailed to each Factory Chief, in order that he should have before him plans and specifications for the construction of the type of safeguards outlined in this pamphlet.

Factory inspectors have instructions to ask for the Factory Chief when visiting a plant, and have him accompany them during their inspection. In this manner his usefulness is greatly enhanced.

Digitized by Google

The Department contemplates the extension of its instructions to Factory Chiefs, to include the elements of occupational diseases, and general factory hygiene. It is desired to impress them with the importance of absolute cleanliness on the part of the workers, especially in those trades where the process includes injurious materials; and also with the fundamental principles for the preservation of health. This movement presents wonderful opportunities for the accomplishment of good.

STANDARDS—The work of the Department has been outlined with the idea of reducing its various activities to fixed standards, to the end that the laws may be enforced, not only in a more comprehensive, but also in a more uniform, manner. We have been successful in the preparation of standards governing the matters of fire escape construction, and the fire-proofing of doors and windows in connection therewith; elevator construction; safeguarding machinery; installation of washing facilities, and a number of other items. These standard specifications are in all cases accompanied by detailed drawings showing the precise manner in which we desire work performed. These drawings have been of the greatest assistance, for the reason that the requirements are so much better understood than where they are set forth without cuts.

MUSEUM OF SAFETY—The next step, however, should include actual working models illustrating the requirements of the Department. For years we have been desirous of establishing a Museum of Safety, where demonstrations could be made of approved types of machinery safeguarding devices; for the removal of dust, obnoxious fumes and excessive heat; structural matters of all kinds; and a general demonstration of the sanitary methods which it is desired to have incorporated in the factories of the State. Museums of this character are maintained in each of the German capitals, and they are visited in large numbers by the school children; the workers; the factory owners; and those required to secure their adoption.

If it were possible to secure the necessary space, an exhibition of this nature would be comparatively easy to provide, for the reason that manufacturers of approved material would be anxious to make the display. Museums of this character would be of inestimable value to all persons interested in factory safety; and the

Digitized by Google

various devices exhibited would bring home to the public a realization of the many phases of the "Safety First" movement, and would offer opportunities of instruction which cannot be surpassed.

HOTELS AND PUBLIC BUILDINGS—The experience of the Department has demonstrated the absolute necessity for State supervision over hotels, meeting houses, and places where the public gather throughout the State, especially in the smaller cities where no local administration is available. There are, no doubt, a number of places coming within this category which require additional protection in the event of fire; and in one week the Department of Labor received three separate complaints from three different portions of the State, asking for the correction of dangerous conditions.

In our judgment, all hotels, apartment houses, and places where the public gather should be provided with an electrical system of alarms, and adequate means of egress. It would be manifestly impossible for the Department of Labor, with its present limited force of inspectors to assume this additional burden; but it would, no doubt, be well to enact State legislation outlining the protection which should be furnished, and permit the enforcement of this legislation to rest in the hands of specified local authorities where such authorities are available. But it would be feasible to permit the supervision of this class of places in the smaller cities, towns, and villages, to come within the jurisdiction of the Department. If it is thought advisable to have this work entirely handled by the Commissioner of Labor, it would necessitate a much larger number of assistants.

ELECTRICAL BUREAU

The report of the Electrical Bureau of the Department of Labor for the year commencing November 1, 1914, and ending October 31, 1915, follows:

Number of orders served, 190; number of fire alarm sketches made, 190; number of inspections made, 740; number of completed installations (examined, tested and accepted), 144; number of active installations, 329; number of plans and specifications examined, 430; number of plans and specifications examined and approved, 196; number of pieces of apparatus examined, tested and accepted, 20; number of pieces of apparatus re-examined and continued on approved list, 85; number of pieces of apparatus withdrawn from approval, 4.

Digitized by Google

Attention is called to the fact that the Signaling Committee of the National Fire Protection Association have recommended acceptance by the Association of rules and requirements covering the installation of fire alarm equipment substantially the same in character and intent as the rules issued by this Department, bearing date of June 1, 1913, and re-issued under date of January 1, 1915.

A personal study has been made of the proposed safety rules to be observed in the installation and maintenance of electrical utilization equipment, which are in course of compilation by the National Bureau of Standards, Washington, D. C. The field covered by the proposed rules is very extensive and will require many months of close study and investigation to enable us, in justice to all concerned, to issue a set of workable rules, to meet the conditions of service as found within the confines of this State. The above statement will be the more readily understood when it is remembered that the National Bureau of Standards has been employed for a period of two years, with every facility for calling together the engineering forces of the largest electrical utility companies in the country, for consultation and discussion of the proposed work.

It is believed that these safety rules will be in shape for publication by the National Bureau during the year 1916, and sufficient progress will have been made in the work of this Bureau to permit of a complete report being submitted, including proposed rules for adoption by this Department, by the first of January, 1917. All possible progress is being made in the matter, with the facilities at hand.

STRUCTURAL BUREAU

The office work of the Structural Bureau consists chiefly of plan examining, preparing rough sketches and specifications covering violations on fire escapes, means of egress, fire-proofing, elevators, toilets and general building construction; also the answering of all correspondence pertaining to information concerning the general structural work of the Department.

During the past year this Bureau has handled 1,193 plans, 1,122 of which were approved. It was not necessary to change more than 25 per cent. of the plans submitted, which shows how well the architects and contractors are co-operating with this

Digitized by Google

Bureau. Many architects and contractors have presented preliminary plans for examination, which helps the immediate approval of the plans, without alterations, after they have been finally completed. Sixty-four plans were rejected as not being in accordance with the law. Seven plans of buildings not coming under the jurisdiction of the Department of Labor were returned.

The approved plans consisted of 136 new factory buildings, 56 new and alterations to bakeries, 93 alterations to factory buildings, 193 new fire escapes, 68 fire-proofing, 20 alterations to old fire escapes, 233 new elevators, 243 alterations to old elevators, and 56 toilets.

In connection with the above plans, a large amount of correspondence has been occasioned through requests of architects and contractors for information concerning general structural data, and in all cases the information given has been appreciated, and, as letters in our files show, the assistance given by this Bureau has been commended by those concerned.

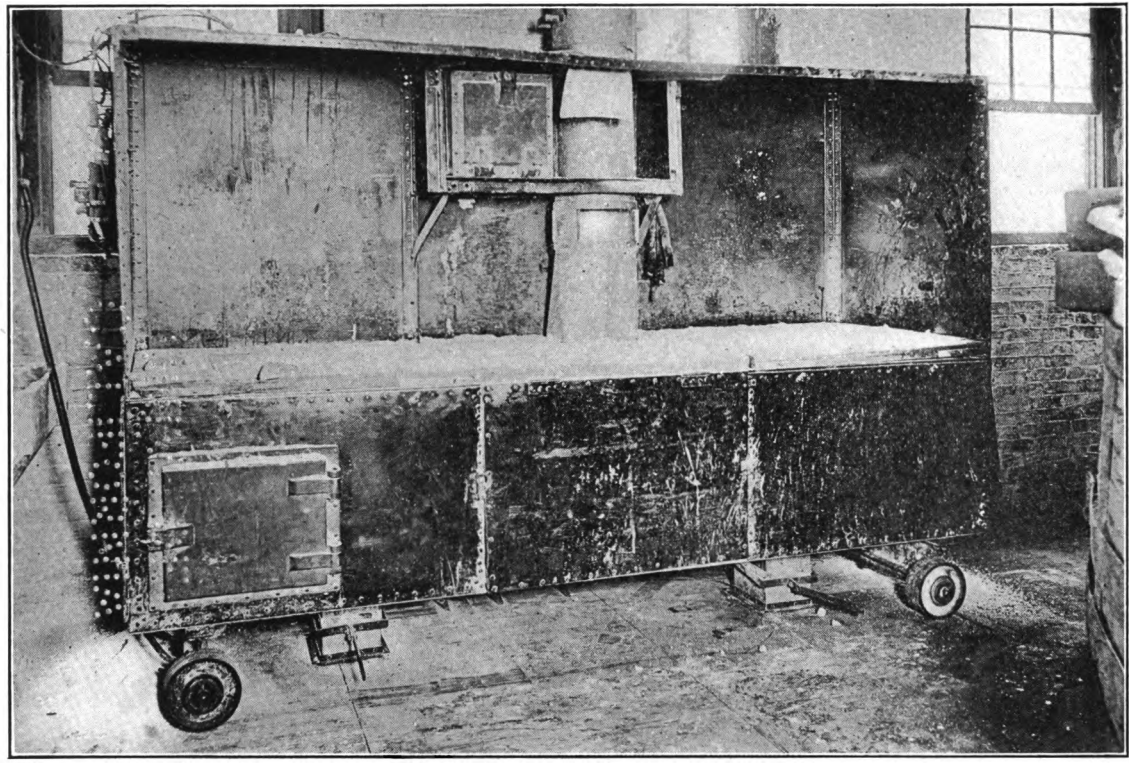
This Bureau, during the past year, has handled over 4,000 letters referring to structural conditions of buildings, from owners, tenants, manufacturers, contractors, Casualty Companies, local Building and Fire Departments, as well as inspectors of this Department.

During the past year, the Structural Bureau has furnished over 160 plans and pencil sketches showing the necessary alterations to factory buildings, fire escapes and openings to be fireproofed in connection with fire escapes; also 9 plans showing special surveys of buildings; 30 plans showing special reinforcements for fire escapes on buildings that contain weak walls or buildings of frame construction; and 7 plans showing the fire protection necessary for public and private institutions.

The engineering features of the Structural Bureau for the past year have been the designing of tower fire escapes; reinforcement of floor beams and girders to eliminate vibration; fire protection for public and private institutions; and the special engineering work in connection with the fire escapes at the Home for Boys, Jamesburg; also the rebuilding of a plant, the walls of which were dangerously out of plumb.

The special work performed by the Structural Bureau consisted of the preparing of a detail drawing, showing a method of providing washing and shower bath equipment in wash rooms for

Digitized by Google



Knocking China-ware. Workers using this machine are protected from dust by means of a mechanical exhaust dust control system.

Digitized by Google

UNIV. OF
CALIFORNIA

Digitized by Google

manufacturing plants, which allows hot and cold water to be used without the need of a hot water supply tank. The temperature of the water can be regulated by a simple steam pipe inlet, which ensures the water at the temperature needed, and which can be adopted in any plant at a very reasonable cost. This equipment is worked out in detail, and blue prints have been prepared which will enable any factory owner or tenant to equip his plant with this installation direct from the print.

A detailed drawing of a hood for polishing wheels has been prepared, which is known as type A hood. This type of hood was adopted on information given by the Ventilating and Sanitation Bureau, and is the first of the series of standards that the Structural Bureau is to prepare for the protection of grinding, buffing, and polishing wheels.

The Structural Engineer was on the road 115 days, during which time he visited 320 factories, 14 bakeries and arranged details of 62 fire escapes, 30 fire-proofing, 103 elevators, 110 general building surveys and alterations, and 20 toilets. He was at the Trenton office 119 days, and spent 53 days in the Newark office.

The special inspections made by the Structural Bureau (by request) the past year covered fire protection in the following institutions: State Home for Boys, Jamesburg; Home for Friendless Children, Camden; Home or Feeble Minded, Vineland; and School for Deaf, Trenton.

The Bureau was also represented at the National Council for Industrial Safety, held in Philadelphia during the week of October 23, 1915.

BRANCHES OF THE STRUCTURAL BUREAU

INFORMATION—The Structural Bureau has continued furnishing information to persons interested in factory buildings and has demonstrated from time to time the best method to pursue in altering buildings to make them comply with the factory law in a manner that would cause the owners as little expense and inconvenience as possible. It has also been outlined how to provide fire escapes, fire-proofing, toilets and ventilation for old and new factory buildings, in the best and most economical manner. Architects and builders have been instructed how to prepare their plans so that they will comply with our requirements without alteration.

Digitized by Google

Elevator contractors and factory owners have been greatly assisted by the Structural Bureau's explanation of the best methods to pursue in reconstructing old elevators; and how to provide protection for elevator shafts by standard gates, or fire-proof doors, that will work automatically or semi-automatically, and lock when closed.

From time to time this Bureau has been called upon to explain the proper method of reinforcing and reconstructing old buildings in a manner that will make them safe to carry the additional fire escapes that may be ordered by this Department, and also make them safe for manufacturing purposes. Requests have been made to furnish information concerning the toilet equipment and proper location for toilets, as well as washing, dressing, locker and rest rooms for factory buildings.

NEW BUILDINGS—The Structural Bureau, during the past year, has received and examined 143 plans of new factory buildings, 136 of which were approved, 3 rejected as not being satisfactory and 4 as not coming under the jurisdiction of this Department. The plans approved distinctly show the means of egress, toilets and elevator equipment, as well as ventilation in accordance with the requirements of the law. A duplicate copy of all approved plans is on file in this Bureau, and a complete record is kept of all plans received, approved and returned.

ALTERATIONS TO BUILDINGS—102 plans have been received, which show alterations to factory buildings; 93 of these plans were approved and 9 rejected as not being in accordance with our requirements. The rejected plans did not show sufficient means of egress, ventilation, toilet arrangements, or the structural changes were not satisfactory.

BAKERIES—60 plans showing new buildings and alterations to old bakeries have been received, 56 of which were approved, 4 being rejected as not being in accordance with our requirements.

FIRE ESCAPES—205 plans have been received showing new fire escapes for factories or buildings in which manufacturing is carried on, 193 of which have been approved, 9 being rejected as not being of standard construction, and 3 returned showing fire escapes for buildings that did not come under the jurisdiction of this Department.

Digitized by Google

TOILETS—60 plans showing toilet accommodations for factory buildings have been received; 56 of these plans were approved, 4 rejected as not being satisfactory. In all cases, one toilet for every twenty people is required, with separate toilets for each sex. The toilets to be provided with a separate vestibule and direct outside ventilation for both toilet and vestibule.

ELEVATORS—240 plans of new elevators have been received, 233 of which were approved, and 7 rejected as not complying with our requirements. In all cases, the approved plans showed the full requirements of the law in so far as elevator construction is concerned, but in a great many cases a fire-proof automatic or semi-automatic door was allowed to be used in lieu of gates, equipped so they could only be opened from the shaft side when the car was at the desired floor landing. 264 plans showing the reconstruction of old elevators have been received, 243 of which were approved, and 21 rejected as not complying with the necessary requirements.

PLANS, SPECIFICATIONS AND SKETCHES—During the past year pencil sketches showing structural changes referred to in the correspondence handled by this Bureau have been prepared. These have often made clear what is referred to in letters, and with the assistance of the pamphlets and standard blue prints furnished by this Bureau it has enabled factory owners, architects and contractors to obtain the desired results without personal visits to the building. It has also been of great assistance to the factory owner, or contractor, to show in a pencil sketch what was explained to them personally in the building.

SPECIAL FIRE PROTECTION INSPECTIONS—During the past year the Bureau was called upon to make special fire protection inspections at the Home for Friendless Children, Camden; Home for Feeble Minded, Vineland; School for Deaf, Trenton, and State Home for Boys, Jamesburg, N. J.

RECAPITULATION:	1915	1914	1913
New building plans approved	136	109	103
New and alterations to bakeries, plans approved	56	72	46
Alteration to factory buildings, plans approved	93	112	42
Fire escape, plans approved	193	314	345

Digitized by Google

Recapitulation:	1915	1914	1913
Alteration to fire escapes	20	10	10
Stairs and stair enclosures, plans approved	24	(Inc. in bldg. alterations)	
Fire-proofing plans approved	68	203	122
New and alterations to elevators, plans approved	476	390	28
Toilets, plans approved	56	50	3
Bridges, plans approved	..	..	3
Total	1122	1260	733

	1915	1914	1913
Factory buildings visited	320	391	436
Bakeries visited	14	32	25
Fire escapes investigated at above buildings	62	115	176
Fire-proofing investigated at above buildings	30	30	66
Elevators investigated at above buildings	103	125	34
Safeguarding of machinery at above buildings	..	12	20
General inspection of above buildings	110	89	140
Special inspection of public buildings	11	10	3
Days spent on the road by Structural Engineer	115	134	145
Days spent at Trenton office	119	105	130
Days spent at Newark office	53	35	26
Days spent making special inspections	11	12	3

During the year 1915, 136 new factory buildings were erected; in 1914, 109; and in 1913, 98, making a total of 343 new buildings in this State for the past three years. All the above factories have been built in accordance with the requirements existing at the time of their erection.

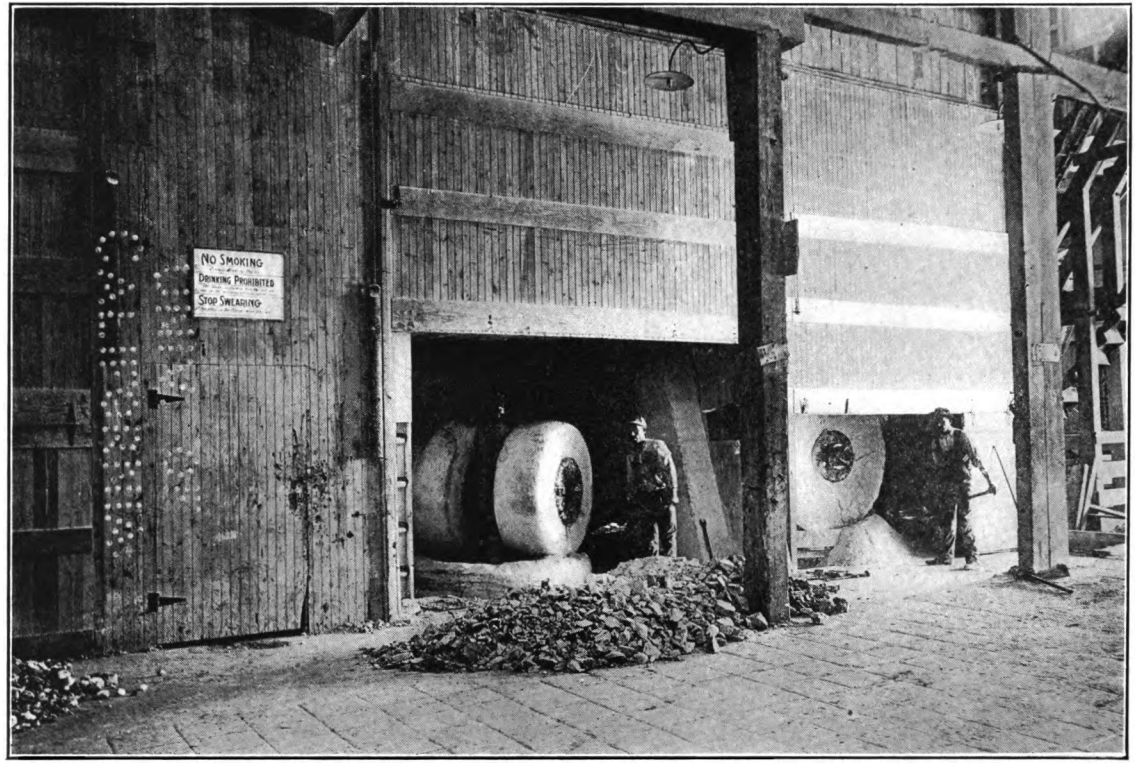
STANDARD SAFEGUARDS

General Requirements for Guard Construction—In preparing this specification, it has been deemed advisable to divide the safeguards into four classes, depending on the use for which they are intended, and to specify a construction for each of these classes. It has been found that the majority of safeguards will come within one of the four classes mentioned.

Standard Guard No. 1 Railing. (To be used only when placed 18" or more from any moving part.)

Standard No. 1 guards shall consist of a railing at least 3' 6" in height, and shall be of the double run type with one rail 3' 6" from the floor, and an intermediate rail midway between the top rail and floor. Such rails and supports or uprights shall be constructed of 1¼" standard iron pipe, or of angle iron 1½" x 1½" x 3/16". Uprights shall be spaced not more than 8' centers, and the entire railing shall be rigidly braced. Railings constructed

Digitized by Google



Flint Grinding. Workers who are engaged in this process are protected by means of a mechanical exhaust dust control system from dust generated by the Dutch Chaser.

Digitized by Google

UNIV. OF
CALIFORNIA

Digitized by Google

of wood shall not be used, except by special permission granted by the Commissioner of Labor.

When ordered by the Commissioner, spaces between rails shall be filled in with wire mesh, expanded metal or other material to be specified by him.

Toe boards 6" in height shall be provided when ordered by the Commissioner. The installation of toe boards is mandatory in the case of all guards installed around fly wheel pits, platforms, hoistways, hatchways and all floor openings.

STANDARD GUARD No. 2. (To be used for guards 4' or more in height fastened to the floor and without other support or bracing. To be used in all other cases when specified by the Commissioner of Labor.)

These guards are to consist of iron framework with suitable filling material, thus furnishing complete protection around moving parts.

Uprights to be 1¼" x 1¼" x ⅛" angle iron, one at each corner of the guard, top edge of the guard to be of the same construction.

Filling material to be held in place by means of ¾" x ⅛" flat fastened to angle by means of 3/16" bolts or rivets spaced not more than 10" centers, or by means of wooden strips 1" x 1" fastened to the angle by means of 3/16" bolts, or in any other manner acceptable to the Commissioner. Perforated or solid sheet metal may be bolted or riveted directly to the angle, or may be spot welded to the same.

When the No. 2 guard is used around a floor opening, the lower section shall be constructed of sheet metal not lighter than No. 18 gauge extending at least 6" above the floor. Where the guard is so located as to be exposed to heavy truck traffic, it is recommended that the entire lower section be constructed of heavy metal.

Framework of 1¼" open seam tubing may also be used for this type of guard, the filling material in this case to be clamped in the seam of the tubing.

The filling material in the No. 2 guard shall be as given under the heading "FILLER" *to follow.*

STANDARD GUARD No. 3. (To be used for guards, no dimension of which is greater than 3', or for larger guards which can be supported or braced at least every 3', and in other cases, when specified by the Commissioner.)

The general construction of this guard shall be similar to that outlined under the previous heading, except that angles may be ¾" x ¾" x ⅛" or larger. Iron pipe ½" inside diameter, or ¾" open seam tubing may be used.

Woven wire guards using square or diamond mesh wire not lighter than No. 12 gauge, on supports of ⅜" round rods, may be used without other framework in cases where a No. 3 guard is required, provided there is no unbraced area of wire greater than 36" x 36", and provided further that supports are placed not more than 3' apart. The square mesh woven wire is to be not greater than 1" mesh, and in the case of the diamond weave, the width of the diamond must be not greater than 1".

Perforated or solid sheet metal No. 22 gauge may be used without framework, provided the guard contains no unbraced area greater than 24" x 24". For larger areas No. 18 or No. 20 gauge metal must be used. All guards of this character without framework must be provided with sufficient supports and braces to hold them rigidly in place.

The filling material in the No. 3 guard shall be as given under the heading "FILLER" to follow.

Digitized by Google

STANDARD GUARD No. 4. (Gear Guard)—These guards shall be constructed of perforated or sheet metal not lighter than No. 22 gauge, or of any of the filling materials approved by the Department, with suitable angle iron or similar reinforcement.

FILLER:—Filling material shall be not larger than ½" mesh wire cloth, or ½" expanded metal, or perforated metal with ½" round holes when guards are placed within 4" of a moving part.

The following table shows the various filling materials approved by the Department, and indicates the least allowable area for each material for which no additional reinforcement is required. The following figures apply to guards with substantial iron framework:

Material.	Allowable Area.
½" galvanized iron wire cloth, not smaller than No. 18 gauge (galvanized after weaving)	24" x 24"
½" expanded metal lath, No. 24 gauge, not less than ⅛ lb. per square foot	24" x 24"
½" No. 18 expanded metal, ¾ lb. per square foot	36" x 36"
¾" expanded metal, not lighter than No. 15 gauge, not less than ¾ lb. per square foot	48" x 48"
Woven wire not lighter than No. 12 gauge, 1" square mesh, or diamond mesh with width of diamond not more than 1"	48" x 48"
Perforated or sheet metal No. 22 gauge	36" x 36"
Perforated or sheet metal No. 18 gauge	48" x 48"

Where the total area of a guard exceeds the amounts given above, reinforcement shall be provided to bring the area within the figure specified for the material under consideration.

GENERAL—In this specification all gauge numbers mentioned for sheet metal are U. S. Standard, and all numbers for mesh wire are English Standard or B. W. G.

All guards shall be permanently and substantially fastened in place, and where it is necessary to have access to any part of machinery covered by the guard, portions of such guard may be arranged to swing or slide. No part of the guard shall be detachable except by permission of the Commissioner of Labor.

All sharp edges of filling material shall be thoroughly protected, and where hand holes or doors are provided in guards, the edges shall be reinforced and protected in such a manner as to be entirely safe. Sheet metal not lighter than No. 24 gauge may be used for such protection.

The foregoing applies in general to all safeguards for transmission machinery, and for individual machines. The following specification applies particularly to transmission machinery.

STANDARDS FOR MACHINERY SAFEGUARDS—TRANSMISSION MACHINERY

SET SCREWS AND COLLARS—All projecting set screws shall be countersunk or replaced with set screws of safety type, or shall be protected by guards with smooth, cylindrical surfaces. All collars shall be cylindrical, and shall contain no projecting screws or bolts.

KEYS AND KEYWAYS—All exposed keys shall be made flush or guarded. All keyways within 36" of a bearing shall be filled or guarded.

COUPLINGS—All shaft couplings shall be of the safety type, with bolts and nuts countersunk or protected by a flange. Clamp couplings and jaw

Digitized by Google

clutch couplings shall be protected by cylindrical sleeves. All shaft couplings not of the safety type, and all friction clutch couplings shall be encased with a standard guard.

METHODS OF STOPPING MACHINES AND SHAFTING IN CASE OF ACCIDENT—Means shall be provided for stopping shafting in each room or department, and throw-out devices shall be installed as ordered by the Commissioner of Labor. Such devices shall be approved friction clutches, tight and loose pulleys, or approved engine stop installations, the latter to be equipped with stations suitably located throughout the building.

Tight and loose pulleys or friction clutches shall be provided on all machines not individually motor driven. Approved belt shifters shall be provided for all tight and loose pulleys.

Operating levers for belt shifters or friction clutches shall be so hung that the force of gravity will tend to keep the belt on the loose pulley, or to keep the clutch disengaged. Belt shifters of the positive type which lock in either position are recommended.

A suitable alarm signal should be provided to notify all operatives before shafting is started.

OVERHEAD TRANSMISSION MACHINERY—Any portion of an overhead shaft, belt, pulley, rope drive or other moving part which is 7′ or less from the floor or platform level, or which must be approached when in motion by any employe for any purpose whatever, shall be encased with a standard guard.

All projecting shaft ends shall be cut off or guarded.

All belts 6 ″ or more in width, and 7′ or more from the floor, and which are located so that they would endanger persons below in case of breakage, shall be securely guarded underneath, and such guards shall extend to the wall or ceiling in such manner as to retain the belt should it break.

There shall be no passageway between the upper and lower parts of a belt, except by special permission of the Commissioner of Labor. In such cases, he shall specify the manner in which such passageways shall be protected.

All pulleys located within 36″ of a bearing shall be entirely encased on the side toward the bearing in all cases where bearings are not self-oiling, and when specifically ordered by the Commissioner.

If possible, pulleys shall be so located that the distance between pulley and bearing, or between any two pulleys, is greater than the width of the widest belt used. Where this spacing cannot be secured, the spaces between pulleys, or between pulley and bearing, shall be guarded to prevent a belt wedging in the space referred to. Belt hangers shall be provided for idle belts.

LOW TRANSMISSION MACHINERY—All vertical shafts and all vertical or inclined belts shall be guarded with a standard guard to a height of at least 6′ above the floor level, except in cases where the guard can be placed 18″ or more from any moving part, when a standard 3½′ railing may be provided.

All shafts, pulleys, belts, rope drives, chain drives, sprockets or other dangerous moving parts of transmission machinery which are less than 7′ above the floor or platform level shall be guarded as follows:

If the guard can be placed 18″ or more from any moving part, a standard 3½′ railing may be provided.

If the guard is to be placed less than 18″ from the moving parts, it shall encase them from a point 2″ below the lowest moving part to a point 6′ above the floor or platform level.

When all of the moving parts are less than 6′ above the floor or platform level, the guard need not extend to a height of 6′, but in such

Digitized by Google

cases the guard shall completely encase the moving parts on the top and sides.

Where belts pass through the floor or where any guard is located around a floor opening, such guard shall extend to the floor level, and shall be equipped with a 6" solid section or toe board at the floor.

No mesh larger than ½" shall be used on guards located within 4" of a moving part.

GEARS—Wherever possible, gears shall be completely encased. Where such method of protection is not feasible, gears shall be protected at least to the root of the teeth.

All exposed sprockets and chains shall be completely encased.

INSPECTION—The Factory Chief or some other responsible person should make periodical inspections of all transmission machinery, and should see that oilers and other employes working about such machinery do their work in a safe and efficient manner. Repairs should be made only when machinery is shut down and no hand oiling should be done, except when machinery is shut down. Care should be taken to see that employes are properly clothed; and loose or ragged sleeves and flowing neckties should be avoided.

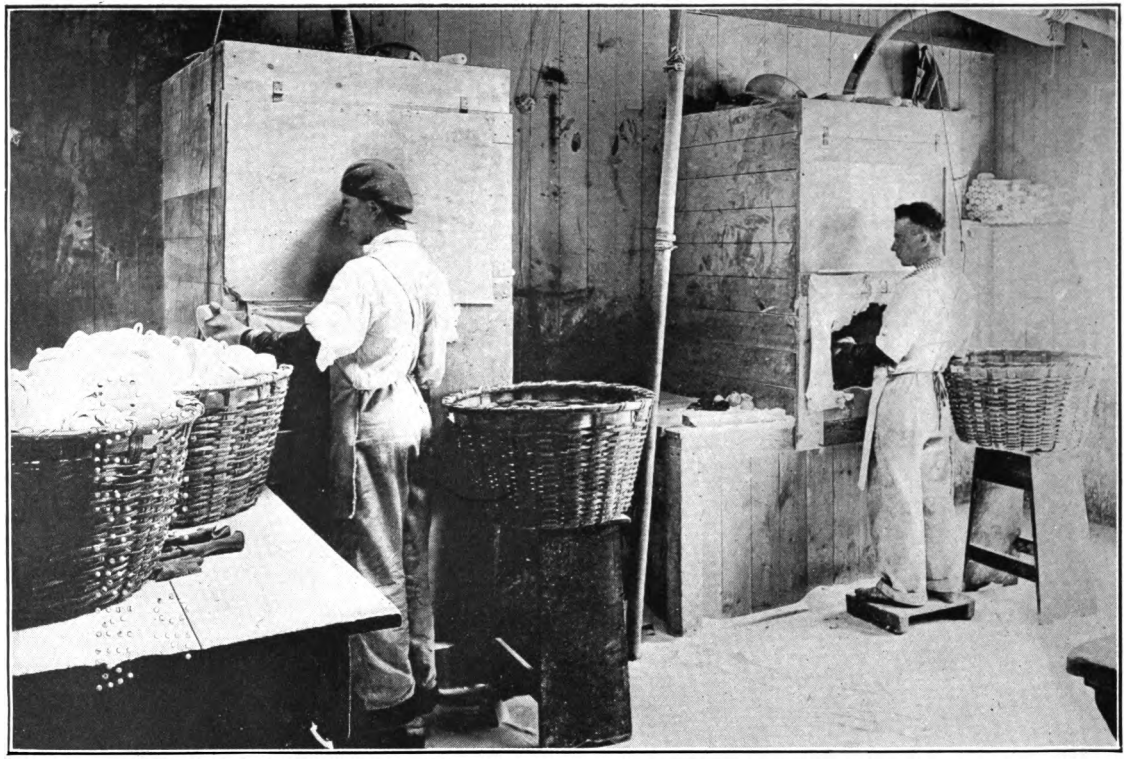
Records of all inspections of transmission machinery and also records of all repairs should be kept, as such information will be found to be of value to the purchasing department.

The law provides that no person shall remove or make ineffective any safeguard around or attached to machinery, unless for the purpose of immediately making repairs thereto. All such safeguards so removed must be promptly replaced. The penalty for violation of this section is $50.00. In some cases it may be advisable to direct the attention of the employes to the penalty above mentioned; but in general it should be the aim of every employer to secure the co-operation of his employes in adopting safe methods, and in using machine guards for the purposes for which they are intended.

All safeguarding of transmission machinery shall be done in accordance with the foregoing specification, and no other construction will be permitted, except upon written application to the Commissioner of Labor, which application must be accompanied by a drawing or sketch showing the exact method to be used.

In the purchase of all classes of machinery, it is recommended that the manufacturers be required to furnish all necessary guards for exposed parts. Guards can best be provided when the machine is being built, and the majority of builders are equipped to furnish their machines fully protected.

Digitized by Google



Sand-blast for cleaning china-ware. Workers are protected from dust by means of a mechanical exhaust dust control system.

Digitized by Google

UNIV OF
CALIFORNIA

Digitized by Google

DIVISION OF HYGIENE AND SANITATION

With the development of the Department's scientific administration of labor laws, there has come a more liberal interpretation of its functions as a conserver of the vitality of the State's workers. The old acceptance of the so-called "inherent risks of industry" has given place to recognition of the fact that no trade rests on a firm social or economic basis which makes undue demand on the physique of its employes. With a better understanding of the individual and collective tragedies resulting from neglect of hygienic factory conditions, has also come realization of the heavy financial loss to certain trades, due to the depleted strength of those whom they habitually, and often unknowingly, sacrifice. Moreover, in the case of induced tuberculosis, due primarily to exposure to dangerous dusts and vitiated air, the resulting cases of infection may spread themselves through a wide area of the community.

Accepting the best foreign standard, that every worker is entitled to clean air; and that (while certain dusts and fumes are more dangerous than others) all contamination of the atmosphere of the workroom must be avoided, the Department has standardized an effective method of mechanical exhaust ventilation, which can be adapted to every variety of manufacturing process that involves the evolution of dust, fume, steam, or excessive heat. How important are the results achieved by such application of our present system can be best judged by a brief review of the special trade hazards now recognized by progressive employers in a wide range of New Jersey industries.

Industrial Tuberculosis—The form of pulmonary consumption now accepted as of industrial origin not only prevails to a serious extent in certain trades, but, spreading from their factories throughout the community, has increased the ravages of the great White Plague among all classes of victims. While devitalized or poisoned air, darkness, dampness, undue fatigue, and local muscular inactivity (due to cramped working position) may all prepare the worker for lowered resistance to tubercular infection, no factor offers so serious a menace as daily subjection to irritating dusts. These, by setting up a progressive inflammation of the mucous membrane of the nose and throat, and of the

Digitized by Google

lung tissues, develop a highly irritated condition of the entire respiratory tract. Where such favorable symptoms exist, tubercular infection may be direct, with early fatal results; or, in the case of sharp dusts, a form of fibroid phthisis may develop which, while of slower action, eventually saps the worker's vitality, and predisposes him to superinduced infection with the bacilli of tuberculosis.

The following list, compiled by the U. S. Bureau of Labor Statistics, gives a few of the industries now regarded as a source of danger (unless under sanitary control), and as automatically preparing the lungs of the worker for a higher than "normal" percentage of tubercular infection:

Per cent. of Deaths from Pulmonary Tuberculosis.	Occupations.
15.2	Tanners and leather curriers.
16.3	Iron and steel workers.
18.3	Machinists.
18.6	Bakers.
18.9	Painters, glaziers and varnishers.
18.9	Tin plate and tinware makers.
19.6	Boiler makers (steam).
21.1	Cotton mill operatives.
22.2	Woolen mill operatives.
24.0	Tool and cutlery makers.
24.3	Tobacco and cigar factory operatives (male).
27.4	Mechanical and manufacturing pursuits (female).
27.9	Rubber factory operatives.
28.6	Marble and stone cutters.
29.2	Plumbers, gas and steam fitters.
29.2	Printers, lithographers and pressmen.
31.1	Glass workers.
31.3	Brass workers.
31.8	Boot and shoe operatives (female).
34.6	Potters.
40.5	Tobacco and cigar operatives (female).

Aside from these industries noted, it is now known that every unwholesome workshop may become a breeding place for the development of tuberculosis bacilli. As has been stated, one affected worker may infect many others, and from such workshops the germs of disease are inevitably spread among the general public. The responsibility for the elimination of dark, unventilated workrooms, and for the control of dust-producing trade processes, or excessive dampness or heat (the results of which predispose the worker to infection) rests with the employers of the State, under the guidance of the Department of Labor. It is a responsibilty of so serious a character that no effort, or expert knowledge, should be spared. Aside from humanitarian considerations, the economic waste of industrial disease and lowered vitality of the worker is a burden to industry and to the State. It is conservatively estimated that the loss in labor-return for wages

Digitized by Google

paid to the physically unfit workers of the country (victims of minor industrial ailments and over-fatigue) exceeds three billion dollars annually. The various phases of loss arising from well-defined occupational disease throughout the United States is far in excess of that prevailing in any other industrial nation.

It should be borne in mind that the death rate from tuberculosis among workers is twice as high as that among the proprietor or professional classes. Moreover, death occurs at the period of greatest productivity, 69 per cent. of the fatal cases from consumption taking place among males under the age of 45 years, and among females, 87 per cent. in the same early period.

But it is only when we turn to the records of the extra hazardous "lung trades" (listed in F. L. Hoffman's "Dusty Trades," published by the Federal Bureau of Labor) that a full realization of the sufferings of the unprotected worker becomes possible. It should be noted that the U. S. Census gives a standard of 14.8 per cent. mortality from consumption for the general registration area. The trades involving exposure to metallic dusts give an average of 36.9 per cent. mortality from consumption, with an additional 13.4 per cent. from other respiratory diseases.

PROPORTIONATE MORTALITY FROM CONSUMPTION IN CERTAIN TRADES

[From an Industrial Insurance Company's Report.]

Among Grinders.

Age at Death.	Per Cent.
15—24 years	57.1
25—34 "	70.8
35—44 "	63.2
45—54 "	40.0

Among Polishers.

Age at Death.	Per Cent.
15—24 years	45.8
25—34 "	56.0
35—44 "	42.6
45—54 "	22.9

Among Tool and Instrument Makers.

Age at Death.	Per Cent.
15—24 years	32.5
25—34 "	59.3
35—44 "	35.3
45—54 "	37.5

Among Jewelers.

Age at Death.	Per Cent.
15—24 years	40.0
25—34 "	59.0
35—44 "	44.0
45—54 "	22.0

Among Brass Workers.

Age at Death.	Per Cent.
15—24 years	59.1
25—34 "	50.0
35—44 "	45.1
45—54 "	24.1

Among Printers.

Age at Death.	Per Cent.
15—24 years	48.5
25—34 "	56.3
35—44 "	40.5
45—54 "	19.9

Digitized by Google

Among Compositors.

Age at Death.	Per Cent.
15—24 years	28.6
25—34 "	66.7
35—44 "	37.5
45—54 "	15.8

Among Glass Blowers.

Age at Death.	Per Cent.
15—24 years	45.8
25—34 "	56.4
35—44 "	25.4
45—54 "	20.0

Respiratory Diseases Among Potters.

(Pneumonia, asthma, bronchitis, etc.)

Age at Death.	Per Cent.
15—24 years	2.2
25—34 "	11.8
35—44 "	11.9
45—54 "	23.1

Among Core Makers.

Age at Death.	Per Cent.
15—24 years	30.3
25—34 "	40.5
35—44 "	36.0
45—54 "	11.1

Among Cotton Spinners.

Age at Death.	Per Cent.
15—24 years	46.4
25—34 "	50.0
35—44 "	44.4
45—54 "	25.9

Among Hosiery & Knitting Mill Employes.

Age at Death.	Per Cent.
15—24 years	21.7
25—34 "	68.2
35—44 "	28.6
45—54 "	22.2

Among Cabinet Makers.

Age at Death.	Per Cent.
15—24 years	35.9
25—34 "	55.7
35—44 "	48.8
45—54 "	22.8

Among Stoneworkers.

Age at Death.	Per Cent.
15—24 years	47.6
25—34 "	52.6
35—44 "	47.7
45—54 "	39.2

Among Potters.

Age at Death.	Per Cent.
15—24 years	23.9
25—34 "	52.9
35—44 "	44.0
45—54 "	28.2

Among Foundrymen & Moulders.

Age at Death.	Per Cent.
15—24 years	23.8
25—34 "	40.4
35—44 "	27.3
45—54 "	22.3

Among Lithographers.

Age at Death.	Per Cent.
15—24 years	56.8
25—34 "	62.2
35—44 "	44.8
45—54 "	23.8

Among Textile Weavers.

Age at Death.	Per Cent.
15—24 years	39.8
25—34 "	53.4
35—44 "	38.1
45—54 "	25.7

Among Rope Makers.

Age at Death.	Per Cent.
15—24 years	50.0
25—34 "	50.0
35—44 "	41.0
45—54 "	33.0

Among Wood Turners.

Age at Death.	Per Cent.
15—24 years	70.0
25—34 "	62.5
35—44 "	17.6
45—54 "	16.7

Digitized by Google

AMONG FURRIERS & TAXIDERMISTS.

Age at Death.	Per Cent.
15—24 years	33.3
25—34 "	38.9
35—44 "	63.3
45—54 "	30.0

AMONG FELT HATTERS.

Age at Death.	Per Cent.
15—24 years	53.8
25—34 "	55.4
35—44 "	45.4
45—54 "	26.7

AMONG SILK WORKERS.

Age at Death.	Per Cent.
15—24 years	34.1
25—34 "	52.5
35—44 "	60.0
45—54 "	22.6

AMONG WOOLEN & WORSTED WORKERS.

Age at Death.	Per Cent.
15—24 years	35.0
25—34 "	43.8
35—44 "	35.7
45—54 "	21.1

AMONG CARPET & RUG WORKERS.

Age at Death.	Per Cent.
15—24 years	52.9
25—34 "	45.5
35—44 "	35.3
45—54 "	20.8

AMONG MATTRESS MAKERS.

Age at Death.	Per Cent.
15—24 years	44.4
25—34 "	42.7
35—44 "	36.4
45—54 "	40.0

While the Department considers the problem of detecting and eliminating tuberculosis risks as of indisputable importance to the entire State, there are many other dust and fume-engendered hazards to the health, and even lives, of workers in a wide variety of industries. The lung is the especial portal of injury or infection, and the fact that nearly 100 cubic feet of air are inhaled and exhaled during an eight-hour day, makes its freedom from contamination of paramount interest.

The following list is a partial survey of hazards recognized by the Department, and either eliminated or in course of special investigation:

LEAD POISONING RISKS—Lead poisoning may occur from exposure to lead dusts or fume. Cases are found among workers in nearly 130 trades, and range from paralysis and lead insanity (usually fatal); double wrist drop; acute lead colic and convulsions (usually fatal) to pernicious anemia, kidney affections, hardening of the arteries, emaciation, loss of muscular force and general chronic debility. Women and young boys and girls are especially susceptible.

Experience has proved that lead poisoning is essentially unnecessary, and can be almost wholly prevented by proper sanitary precautions.

Lead Fume Risks and Danger from Oxide Dust on Surface of Molten Lead or Alloys:

Lead smelting (lead and lead bearing ores), lead refining, lead pipe manufacture, lead alloy manufacture, lead shot manufacture, lead seals manu-

Digitized by Google

facture, lead bottle top manufacture, lead typesetting, lead stereotyping, lead linotyping, lead plumbing, lead sheet metal manufacture, lead storage battery plate manufacture, lead tempering of steel and wire, lead burning, melting brass where scrap lead is used, etc., etc.

Lead boils at 1,450°-1,600° Centigrade. In general trade processes this temperature is never reached. The especial danger from so-called "lead fume" from molten lead, at an ordinary temperature, is really due to the constant formation of a scum of poisonous sub-oxide on the surface. Whenever the melted lead is stirred, or any draught strikes it, this scum is blown about in an almost invisible powder. Whenever scrap-lead is melted, the danger is greater than where clean pig-lead is handled.

Lead Dust Risks exist in the manufactures of white lead, red lead, litharge, lead paints, dry colors (chromates), acetate of lead, storage batteries, rubber, oil cloth and linoleum, pottery and tile glazes, sanitary lead enamelled ware, lead enamelled signs, etc., etc.; in all trades where lead colors are used, in all dyeing of silk or yarn where lead colors are used, in all handling of dry lead-compounds, in all handling of scrap lead materials.

In some department of almost every industry materials containing lead are habitually or occasionally employed. Usually the workers, and frequently the employers, are ignorant of the risks offered. It should be borne in mind that lead, whatever its form, is never harmless to the worker. All lead (if the industrial health of operatives is to be preserved) requires strict sanitary control in all stages of its handling.

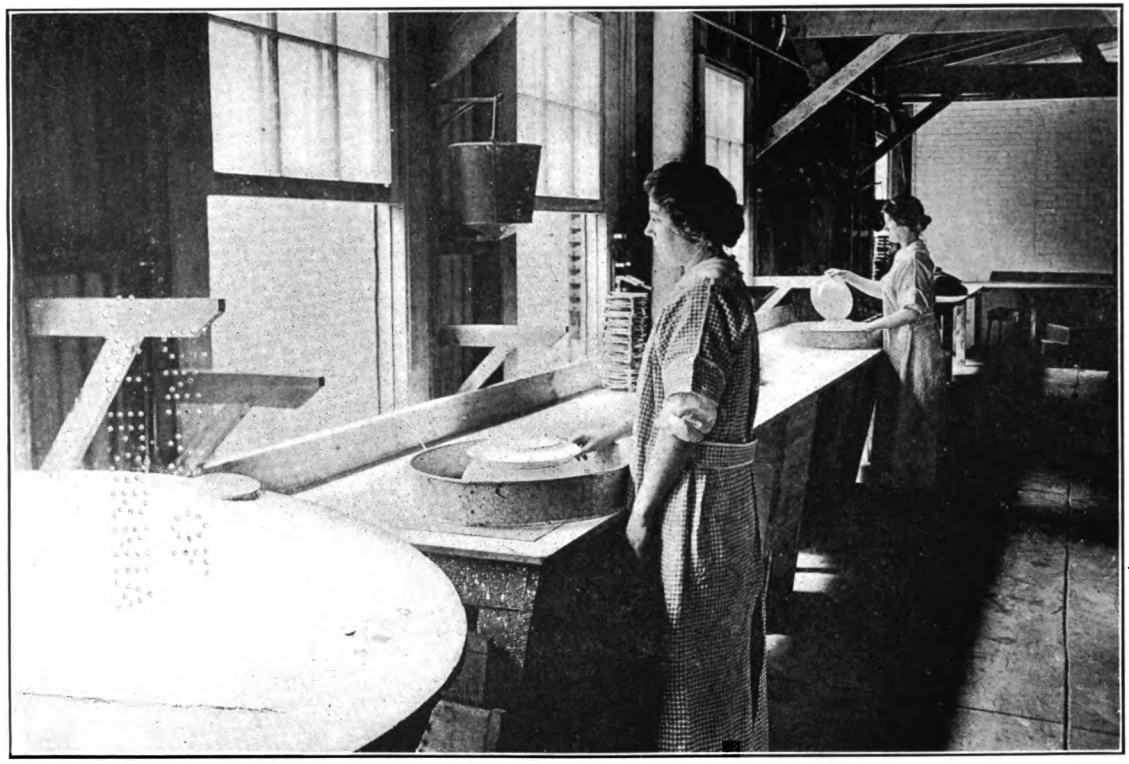
The workers who, in general, suffer most from chronic plumbism, are painters. Acute lead colic, however, is frequently the consequence in this trade, especially among house painters, where dry-sanding is practiced. (These victims are not under the jurisdiction of this Department.) The Department is exercising its authority in requiring clean, dustless factories, and absolute cleanliness on the part of the workers (washing, shower, locker and lunch facilities) in all lead trades, the investigation of which has shown existing hazard, or the possibility of chronic and acute plumbism.

One of the most interesting achievements along the line of lead "fume" control has been the introducing of mechanical exhaust ventilation over linotype machines in the printing establishments of the State. This has not only eliminated lead sub-oxide "scum" hazards from the open melting pots of linotype machines, and from slug melting pots and stereotype melting pots, but has also removed the gas fumes which ordinarily vitiate the air of the printing establishment.

Special investigation has also been made of the lead risks in the dry-color trade, and standardized regulations are in course of preparation.

RISKS FROM MERCURY—Mercury poisoning is usually chronic in its form; the symptoms include lassitude, pallor, ulceration and swelling of

Digitized by Google



Artistic China. Workers who are cleaning glost-ware are protected from dust by means of a mechanical exhaust dust control system.

Digitized by Google

UNIV. OF
CALIFORNIA

Digitized by Google

the gums, loss of teeth, tremor (commonly known as the "shakes") or palsy; and serious nervous and digestive disturbances. Mercury is volatile at the ordinary factory temperature, and poisoning may result from its fumes; from direct absorption through the uninjured skin; and from absorption in the form of dust.

Risks of poisoning are found in amalgam gilding and in the manufactures of thermometers and barometers, Roentgen and Hittorf tubes, amalgams and salts of mercury, antiseptics, antiseptic dyes, English vermillion, hat fur (nitrate of mercury), felt hats (nitrate of mercury), photography and steel engraving, etc., and fulminate of mercury for explosives.

The fact that mercury poisoning has long prevailed in one of New Jersey's distinctive industries led the Department to conduct one of the most exhaustive trade investigations ever attempted in this country. The results have been recently published in a Department Bulletin, entitled "Sanitary Standards for the Felt Hatting Industry." This not only covers the special health hazards from mercury and induced pulmonary diseases, but also gives detailed specifications of sanitary reform which it has been demonstrated will control those evils, so long regarded as inevitable features of the felt hatting factory.

That consumption-breeding and mercurialized dusts can be removed by mechanical exhaust ventilation; that the pervasive steam of the Back Shop can be practically eliminated; that gas fumes and excessive heat need not contaminate the air of the Front Shop, has been either already demonstrated, or is being accomplished in a majority of New Jersey factories. By those familiar with the supposedly insuperable difficulties successfully met by the experts of the Department, the Felt Hatting Bulletin is regarded as one of the most notable achievements in the history of American Trade Sanitation.

Risks from Arsenic Compounds—Chronic Poisoning: Constant headache, melancholia, sleeplessness, gastric disturbances, emaciation, waning strength, catarrh of mucous membrane, skin diseases, abscesses, ulcers of mouth and nose, falling out of hair and nails. Also disturbances of the central nervous system, etc.

Acute Poisoning: Constriction of the esophagus, pains in bowels, vomiting, bluish skin, vertigo, convulsions, death.

Arsenic poisoning may result from inhalation of gas or dust; or from absorption through the respiratory organs or mucous membrane, and the stomach or intestinal canal.

Trade Risks exist in the manufactures of glass, colored chalk, chloride or arsenic (brass etching), lead alloy shot, arsenic colors, organic dyestuffs (and use), textile dyestuffs (and use), colored papers, artificial flowers, colors in painting, Paris Green (arsenate of copper.)

Digitized by Google

(It is to be noted that zinc, silver, lead, copper and the commercial acids often contain more or less arsenic, which is liberated in trade processes.)

The most common trade risk for arsenic is in the manufacture of Paris Green, which is usually an adjunct of the dry color houses during January to June. An unskilled class of operatives is usually employed, who are ignorant of the danger. Hitherto none, or few, sanitary precautions have been observed.

In addition to the "common trade poisons" generally recognized as offering danger, there are others which are attracting special investigations by the Department.

TURPENTINE POISONING—In the form of vapor, it acts upon the mucous membrane; in a fluid state, it acts upon the skin, producing severe irritation and dermatitis.

Symptoms—Irritation of mucous membrane of the eyes and nose, producing coughs and bronchial affections; conjunctivitis; giddiness; nausea, vomiting and headache; irritation of the kidneys; urinary and circulatory affections; nervous disorders; emaciation.

Turpentine risks exist in the manufacture of varnish, lacquer, sealing wax, paint and colors, tapestry, and in the trades of the decorator, lacquerer and painter.

In various industries it is used as a cleansing agent, and serious eczema may result from handling.

SULPHURIC ACID POISONING—In the form of vapor it acts upon the respiratory organs. When splashed on the skin, the acid burns deep into the tissues.

Symptoms—Inflammatory affections of the respiratory organs; inflammation of the lungs; injury to the teeth (destruction of dentine), and sometimes injury to the bones.

While sulphuric acid fumes are present in a wide range of processes, they are to be looked for in an injurious degree in special trades.

Sulphuric acid risks exist in manufacture of sulphuric acid and fertilizer, burnishing of iron, steel, etc. (pickling), manufacture of sodium carbonate, textile industries, manufacture of nitroglycerin, petroleum distillation, electrolytic refining of copper, electrolytic plating, etc., etc.

This acid fume does not actually diffuse and become harmlessly dilute in tank processes. The molecules of steam from warm sulphuric acid baths may each carry an infinitesimal particle of almost undiluted acid, and these are capable of attacking the mucous membrane, and setting up progressive inflammation of the respiratory tract.

NITROUS (NITRIC ACID) POISONING—Inhaled in the form of vapor.

Digitized by Google

Symptoms—Chronic: (More rarely acute.) Pale, sallow complexion; chronic bronchial catarrh; lowered vitality; injury to teeth.

Acute: (Commonly develops several hours after exposure.) Choking, cough, labored breathing, gasping speech, cold perspiration, bluish pallor, loss of consciousness; urinary affections. Death may result from oedema of the lungs.

Nitrous gases are produced by the action of nitric acid on metals (iron, lead, zinc, etc.), on organic substances (coal dust, wood, straw, paper, woolen refuse, etc.)

Poisoning risks exist in metal etching, metal refining, chemical works, manufacture of explosives (nitroglycerin), manufacture of nitric acid, manufacture of gun cotton, manufacture of lead chromates in the dry color trade, manufacture of bleaching materials, manufacture of hatters' fur (nitrate of mercury), dyeing and printing, plating and pickling of metals, etc., etc.

It is assumed by most employers that workers become "immune" to acid fumes, both sulphuric and nitric. While a certain toughening or "tanning" of the membrane of throat and nose usually results, this does not prevent the development of the chronic symptoms commonly ignored.

The physician rarely has opportunity to recognize the cause of chronic industrial disease but in the case of acute acid poisoning, the ensuing respiratory symptoms are unfortunately too often diagnosed as congestion of the lungs or pneumonia.

Wood Alcohol Poisoning—Absorption through the skin, and by fumes through the organs of respiration.

Symptoms—Acute: (Very persistent.) Nausea, headache, ringing in ears, weakness of the muscles, insomnia, delirium, difficulty in breathing, inflammation of throat and bronchial tubes, blindness, death by paralysis of the respiratory organs.

Chronic: Conjunctivitis, fatty degeneration of the liver, giddiness, headache, anemic condition, chronic "dope."

Carbon Bisulphid Poisoning—Inhaled as a vapor and absorbed through skin. (Used chiefly as a solvent in the rubber trade in Parkes Process [cold cure or acid cure and vapor cure] for rubber gloves, balloons, toys, nipples, medical rubber supplies, etc., and in welding.)

Chronic Symptoms—(Affecting chiefly central and peripheral nervous system and glandular tissues.) Headache, vertigo, confusion of vision, pains in limbs, nausea, vomiting, insomonia, constipation, depression.

Severe Cases: Dyspnea, paralysis of legs and bladder, painful urination, albuminuria, anemia, sometimes conjunctivitis and skin eruptions. Symptoms persistent, involving motor, sensory and psychic functions. Alternations of excitement and depression. Uncertain gait and speech, occasional

Digitized by Google

tremor, loss of memory, loss of sensation. Women and young people are especially affected.

BRASS POISONING (Zinc fume) (Brass dust)—Inhaled in the form of vapor, in alloys of copper, tin and zinc. Poisoning is probably due to auto-intoxication from absorption of the nasal and throat mucous membrane, destroyed by action of the metal fume. Hazard exists in all handling of molten zinc alloys.

Acute: Brass chills or ague; languor; depression; chilliness; profuse perspiration; headache; nausea; muscular pain and cramps. (Usually at night.)

Chronic: Inhalation of brass dust from grinding wheels, filings, etc. Irritation of respiratory mucosa and lungs; digestive derangements, gastric catarrh; nausea, vomiting, thirst; metallic taste in mouth; headache; muscular pains.

PHENOL POISONING (CARBOLIC)—Poisoning from carbolic fumes is characterzied by vomiting; salivation, and difficulty in swallowing. Chronic nephritis may develop and the urine become a smoky gray color. Emaciation ensues, known as "carbolic marasmus." The symptoms in general resemble those of dinistrobenzol poisoning, and include amblyopia, scotoma, brownish yellow skin, failing appetite; yellow hue of mucous membrane of mouth and throat. Severe catarrhal icterus supervenes.

NITRO-BENZOL POISONING—Inhaled as fume or absorbed through unbroken skin. Exposure principally during the action of nitric and sulphuric acid upon benzol in the manufacture of anilin. Used also in the manufacture of explosives.

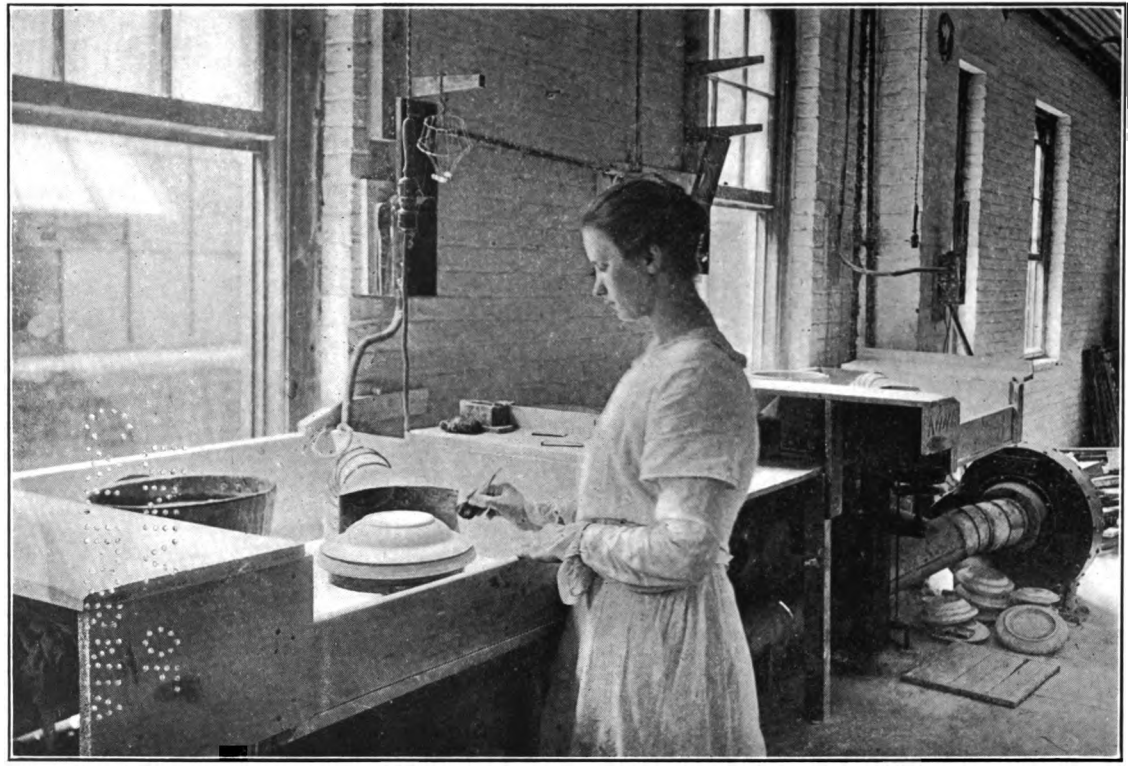
Symptoms—Acute: Throbbing headache, dizziness; nausea; vomiting; diminished blood pressure; weakness; blue tint of face and lips; drowsiness; fatal coma.

Chronic: Blue tint of face and body; anemia; lassitude; slow pulse; uncertain gait; hesitating speech; amblyopia; coma; tonic and chronic convulsions; nausea; vomiting.

Wood Alcohol Risks exist in the preparation and use of varnish, lacquer, polish, coal-tar colors, shellac, "dope" in artificial leather, and "wine" stiffening in stiff felt hatting trades, etc., etc.

The risk to the worker involved in the handling of quick-drying varnishes and other materials dissolved in wood alcohol is serious enough to warrant its prohibition, unless under strict sanitary control. The Department possesses photographs and records showing cases of total blindness produced by only a few hours' employment in varnishing brewery vats with wood alcohol shellac.

Digitized by Google



Artistic China. Worker who is cleaning green-ware is protected from dust by means of a mechanical exhaust dust control system.

Digitized by Google

UNIV. OF
CALIFORNIA

Digitized by Google

In addition, the Department has listed trade-poisoning risks from:

Ammonia	(Especially in cold storage plants and breweries)
Amyl Acetate	(Lacquer, solvents, enamels, etc.)
Amyl Alcohol	
Antimony Compounds (rubber trade)	
Arseniuretted Hydrogen	(Electrolytic acid bath process)
Chloride of Lime	(Bleaching)
Chlorine	(Manufacture of chloride of lime)
Cyanogen Compounds	(Electrolytic plating, etc.)
Formaldehyde	(Disinfectants)
Hydrochloric Acid	(Manufacture of soda and hydrochloric acid)
Hydrofluoric Acid	(Cut glass industry)
Manganese Dioxide, etc., etc.	

CHROME POISONING—Absorption by the skin and mucous membranes; in the form of dust through the respiratory organs.

Symptoms: Pit-like ulcers develop, which burrow into the flesh of the hand, arms, and thighs; also into the mucous membrane of the tonsils and the hard and soft palate, and perforate the septum of the nose. Chronic: Bronchial catarrh, and inflammatory symptoms in lungs and kidneys.

Chrome Risks exist in the manufacture of Chromium preparations (bichromate of potash and soda) chrome colors and Turkish red mordant dye; chrome tanning, staining of wood, textile printing, etc., etc.

Risks are especially great in the making of bichromate of potash and soda, largely used by the dry color trade.

CARBON MONOXIDE POISONING—

(Coal vapor contains from .5 to 5 per cent. Illuminating gas contains from 6 to 10 per cent. Water-gas contains from 40 to 41 per cent. Producer gas contains from 30 to 34 per cent.)

2/3-1000 parts of carbon monoxide in air breathed in confined room causes rapid and dangerous injury; .5-1.0—1000 bearable from 30-60 minutes without grave effect: .2-1000 produces minor symptoms after several hours.

Gas is breathed through respiratory organs.

Symptoms—Acute: Increased blood pressure at first; later, lowered pressure; weak pulse; formation of carbon monoxide haemoglobin.

Mild cases: Dull headache; flashes before eyes; giddiness; nausea, etc.

Severe cases: Bluish discoloration of the skin; spasmodic respiration; convulsions or paralytic symptoms; asphyxia.

Digitized by Google

Chronic cases: (Among ironers, firemen, cooks, etc.) Headache; dizziness; nausea; anemia; palpitation; insomnia; debility, etc.

Carbon Monoxide Risks exist in industrial plants from defective heating arrangements, manufacture of gas, blast furnaces, gas purification, coke ovens, smelting furnaces, gas machines, lime and brick kilns, iron and metal foundries (drying of the molds), soldering in tin shops, charcoal burning, resin distillation, heating foundries, etc., with "salamanders," open brasiers, etc.; drying chambers, etc.

The increasing use of producer gas in industrial plants has led to serious carbon monoxide risks in a new field. While the Department has no authorization of present jurisdiction, there is no question as to the necessity for better sanitary regulations in the gas plants of the State.

Carbon Dioxide Poisoning—Enters the body in the form of gas by inhalation.

Symptoms—Pressure in the head; vertigo; ringing in the ears; sparks before the eyes; pain in chest; rapid breathing; gradual decline of pulse; suffocation (occasionally convulsions, delirium.)

Carbon Dioxide Risks are generated in mines, lime and brick kilns, decomposition gases, tanneries (tan pits), sugar mills (saturation vessels), manufacture of carbonic acid and mineral waters, compressed yeast factories, breweries, fermenting rooms, firing and heating establishments, linotype rooms from gas-combustion, the lighting of workrooms, the exhaled air in closed workrooms and caissons.

Benzine Poisoning (Gasoline) (Solvent Naphtha) (Benzole)—Breathed in the form of vapor; some absorption through the unbroken skin.

Symptoms—Acute: Headache; nausea; vomiting; cough; irregular respiration; weakness of heart; coma; depression; twitching of muscles; trembling.

Chronic: Headache; flashes before eyes; ringing in ears; excitement resembling intoxication ("naphtha jag.")

Benzine Risks exist in benzine distillation, chemical cleansing plants, fat solvents, lacquer, varnish and India rubber plants, rubber welding, cementing, printing and varnishing, manufacture of water-proof materials (rubber mass dissolved in benzine), manufacture of balloons, and dipped and spread goods, ornamental feather factories, use as a source of motive power, use in quick drying paints.

Benzol is a more dangerous poison, attacking the nerve centres and affecting women especially. It is in free use in many industries in cleansing and dissolving trade greases; as a paint remover; in dye works, lacquer and varnish, rubber, etc.

Digitized by Google

Symptoms—Acute: Vertigo; faintness; hallucination; muscular prostration; nausea and vomiting; irregular pulse; cyanosis; dilation of pupils; cold perspiration; delirium; convulsions; paralysis.

Chronic: Vertigo; headache; faintness; ringing in ears; loss of appetite; dyspepsia; tremor (occasionally hemorrhages of nose and mouth; ulceration of gums and lips); fatty degeneration of kidneys; blood vessels, liver.

ANILINE POISONING—Breathed in the form of vapor. (Toxic in a strength of 0.1 volume per cent.); or quickly absorbed through the unbroken skin.

Symptoms—Acute: Delirium or coma; epileptiform convulsions; general tremors; irregular respiration and heart action; the blood gives the spectroscopic band of methenoglobin; the mucous membrane of lips and mouth are blue to blackness; pupils narrow; cold perspiration; temperature subnormal; death after coma.

Mild Acute: Lassitude; vertigo; weakness; hesitating speech; shuffling gait; headache; pallor; blueness of lips; dark urine.

Chronic: Anemia; bronchitis; general nervous symptoms; headache; ringing in ears; vomiting; dullness; eczema; blue tint of skin (aniline "blues"); irritation of bladder; carcinoma of the bladder.

Aniline Risks exist in the manufacture of aniline oil and its derivatives, and in the manufacture of aniline dyes and their use.

In reviewing some of the special fume and dust hazards, it must be borne in mind that the class of workers most commonly subjected to injury is the one least able to understand the nature of the risks incurred, or the methods of personal hygiene best calculated to offset the probable effects of exposure. This is especially true of the lead and dry-color trades, and throughout the chemical industries employing foreign labor. This helplessness of the immigrant-worker further emphasizes the duty of the Department to spare no effort in the detection and remedy of unsanitary factory conditions.

The recent experiments in this and other States in the manufacture of phenol, aniline, and other coal-tar derivatives (as a result of the war shortage) has shown the generally unsuspected dangers resulting from the handling of subtle trade poisons.

It has been the desire of the Department to publish a standardization of actual installations for the removal of dusts and fume, covering specific gravities; centrifugal force; natural lines

Digitized by Google

of fume-curve; and all recorded data as to the most economical and effective methods of protecting the worker exposed to special hazard.

The Department feels that such publications would not only be of inestimable benefit to those endeavoring to conserve the health of New Jersey's thousands of operatives, but that it would also be of benefit to the industries concerned, and an incentive to manufacturers in other States to adopt a uniform sanitary standard. While it has not been possible to issue bulletins covering special investigations in potteries, porcelain plants, flint mills, lithographing plants, and the manufacture of pearl buttons, brief summaries are included in this report because of their timely interest to the employers and workers of the State.

LINOLEUM

The manufacture of linoleum, as formerly carried on in New Jersey, at one time involved a certain amount of lead exposure on the part of the operatives, who were usually foreigners, illiterate, and having a poor standard of life. However, this has been remarkably changed by the introduction of new methods, so that at least in this State the lead risk in the production of linoleum is negligible.

The material that forms the base of linoleum is linseed oil, which (through a long dripping exposure to air in special rooms set apart for that purpose) has become oxidized. Having formed into a solid material, this oxidized oil is ground into a fine powder; is mixed with wood pulp and finely ground cork; and after passing through rolls, and printing or inlaying as the case may be, becomes the finished product of the dealer.

Until very recently the cork-grinding department of a linoleum plant involved not only a great dust-risk, but also involved a fire and explosion hazard of the first magnitude. Several such instances are on record, notably one in England several years ago; where the cork room in a linoleum plant, by reason of ignition, became a seething mass of flame; the air being so charged with the dry combustible cork particles as to burn like an explosive gas.

The department, several years ago, issued orders on linoleum manufacturers to organize their work in the cork department so as to minimize the aggravating dust-evil. As a consequence, the

Digitized by Google

methods of handling cork in such plants have been completely revolutionized; so that now the cork department is almost entirely free from the cough irritating dust that formerly characterized it.

Cork comes largely from Portugal. Like cotton, it is shipped in large bales, and the first operation in a cork mill is to break these bales. As the industry is now carried on, when the bales are broken, the cork is conveyed by mechanical draft into a breaking-up machine, where the large lumps are broken into finer pieces, and these pieces are again conveyed by mechanical draft to a grinding machine, consisting of an upper and lower stone, which grinds the cork into a fine powder. The cork is then conveyed mechanically to a bolting machine, where it is screened and bolted; and the coarser particles are returned to the grinding operation for further reduction. When the cork has been ground to its proper consistency, it is carried in tightly enclosed conveyors to a point where it is filled into tight duck bags. Formerly, this bag-filling process created an enormous amount of dust; the operator having quantities of it on his clothes and all parts of his person, and in his hair and nostrils. A stranger visiting the plant would find it hard to believe that men could be hired for wages to work in such an atmosphere. Moreover, the bags into which the cork was filled were open and porous, so that the fine light material sifted through the loose web, and every motion of the bag added to the general dust conditions. In addition to this, these bags were hoisted up by means of a block and tackle to a mixing point high above the operative's head, where they were roughly dumped, and a large percentage of the material passed out into the air in the form of dust.

These methods have been changed. The bag-filling operation is now accomplished by means of tight bags with a fine web; and an arrangement that mechanically disposes the right quantity gently, without unduly disturbing the cork, and eliminates the dust feature. The container in which the cork, wood pulp, and linoleum bases are mixed is now located under the floor, and the material is poured through an opening left for that purpose, thus making the operation practically dustless.

In one of the larger linoleum plants, an air washing apparatus has been installed in conjunction with mechanical exhaust draft, that handles dust from baling, breaking, bolting and conveying operations for the recovery of the material. The economic

Digitized by Google

loss which might result from the wastage of material is so small that the main purpose of the air-washer is merely to prevent the dust that has been collected by the blower system from being thrown out into the air to the annoyance of other operatives in, or neighbors of, the plant.

The Department has achieved a pronounced success in settling this vexatious problem which has existed for many years, and that at the beginning of the campaign appeared hopeless. The manager of one of the plants now operating under bettered working conditions maintains that the improvement is advantageous from a business as well as a humanitarian point of view.

POTTERIES

In August, 1912, the United States Bureau of Labor published a bulletin on "Lead Poisoning in Potteries and Porcelain Enameled Sanitary Ware Factories" which contained the following statement: "The white ware potteries of New Jersey, Ohio, West Virginia and Pennsylvania are subject to no speical rules of sanitation, but simply come under the general state laws governing factories and workshops. There is a remarkable uniformity in these establishments, so far as the almost complete lack of hygienic regulations is concerned."

While the statement was, perhaps, so far as New Jersey is concerned, more broadly drawn than the actual facts would warrant, it must be admitted that factory hygiene in the establishments referred to was far from satisfactory. The industry, not alone in New Jersey or the United States, but formerly in most of the foreign countries, has merited criticism for not being conducted more in harmony with practices calculated to conserve the health of the workers employed therein. It must be remembered, however, in discussing the responsibility of the State to correct evil features in such an industry, that it is called upon to revolutionize practices sanctioned by long periods of trade usage, and usually accepted by the workers and employers as necessarily inherent in the trade.

ENGLISH STANDARDS—A Royal Commission (operating under an act of Parliament at an expense of thousands of pounds sterling, and covering many months of activity) has investigated

Digitized by Google

Color-Blowing in a Porcelain Plant. The worker is protected from harmful fumes, generated by the process, by means of a mechanical exhaust fume control system.

Digitized by Google

UNIV. OF
CALIFORNIA

Digitized by Google

trade practices in the pottery industry in England, from the viewpoint of sanitation and hygiene. The regulations established by the Secretary of State (under section 79 of the Factory and Workshop Act) in accordance with their findings, did not become operative, however, even in part, until January 2, 1913; and the section referring to knocking biscuit flat ware (work that always entailed health hazards of a most serious nature) did not become operative until January 2, 1914.

The manufacture of pottery is one of the large and commercially important industries in New Jersey. It has been roughly estimated that some three thousand persons are engaged in the manufacture of sanitary, general and china ware in Trenton alone; while large numbers are also employed in fire clay, tile and porcelain plants throughout the State.

NEW FACTORY STANDARDS—Until the passage of the law in 1912 giving the Department of Labor authority to devise ways and means for the removal of industrial dust, noxious fumes and excessive heat, and a further extension of power in 1913 covering safeguarding of processes exposed to lead risks, the powers of the Department were limited to sanitation, safeguarding of machinery, fire risks and supervision of employment of child and female labor. Since the passage of these several laws, the Department has made an exhaustive study of trade risks in the pottery industry, and has issued orders on pottery owners concerning the various points where injury to health might be suffered by operatives. In the sanitary, general and china ware potteries, the use of a glaze which contains lead exposes the worker to the danger of lead poisoning, or its concomitant ills. In consequence of this, orders have been issued by the Department requiring that floors in dipping rooms shall be constructed of some impermeable material which shall be washed down every day; that sidewalls shall be painted with washable paint and washed down every day; and that boards on which dipped ware is carried shall be washed after each using. In addition to this, washing accommodations have been ordered for persons handling materials containing lead, which consist of one hot and one cold water tap for each five persons employed; and a dressing room and lunch room so separated from the workrooms where lead is used, that no dust can possibly penetrate them.

Digitized by Google

These orders have been served on all plants where lead glazes are used, and those parts of the orders referring to washing and dressing accommodations have been issued on other branches of the pottery industry where the work is dirty, and, in the judgment of the Department, accommodations of this character are required.

DIPPING ROOMS—Dipping rooms in potteries where lead glazes are used have long been regarded by experts (who have made a study of health hazards in the lead trades) as offering many opportunities for poisoning.

Foreign governments, notably the Austrian, German, and English, have established positive and mandatory regulations concerning trade practices in dipping rooms, which are designed to safeguard the worker from dust in which lead is contained. The personal element enters largely into any precautions designed to safeguard workers handling dangerous materials; so that a large measure of safety can be obtained by scrupulous personal cleanliness; avoiding the eating of foods or the use of tobacco while at work; and by careful washing before the noonday rest, and when the day's task has been completed.

In all of the foreign countries where regulations or authorization of inspectors have been established for the dipping feature of the pottery industry, the dipping-room floor must be made of impermeable material, or treated with washable paint that admits of perfect cleaning after the day's work is done; the boards on which dipped ware is placed must be thoroughly cleaned after each using, and the clothes and wearing apparel of the workers must be kept in such a cleanly condition that dusts are not likely to rise from them.

The New Jersey pottery reports seem to indicate less danger from lead poisoning now than heretofore. Undoubtedly this is owing to greater personal cleanliness on the part of the worker; the diffusion of intelligent information relative to the lead hazard by expert investigators; the action of the National Operative Potters Union in employing a sanitary inspector whose business it is to inspect potteries; and the establishment of a "Health Committee" consisting of representative manufacturing potters and representatives of the National Brotherhood of Operative Potters, whose duty it is to devise rules and regulations for the guidance of all persons concerned. What also contributes in a large meas-

Digitized by Google

ure to this lessening of lead poisoning is the action of the State Department of Labor in carefully inspecting pottery establishments, and requiring the installation of sanitary safeguards.

There is no question but that the practice of installing impermeable floors and thoroughly cleansing them after the close of each working day, as well as carefully washing boards on which ware has been placed, has done much to keep the air free from lead dust, and as a consequence to reduce the old time lead risk that claimed so many victims in dipping establishments of this and other States, and other countries.

Color Blowing—Formerly when ground laying and tinting were more generally done, decorating was a dangerous process in the potteries; but the change in popular demand has done away with much of this work. Pottery ware is now largely decorated by a transfer system that is not to be listed in the hazardous processes. Hand painting still continues, but the hand painters use lead colors in an oil medium, so that if they merely use ordinary sanitary care they run no risk from the materials which they handle. In some of the potteries the tinting of ware is still carried on. In tinting ware, the colors are applied by means of a spray driven through an atomizer by compressed air. The Department requires that the ware be held under a hood which is designed to enclose completely the operation, leaving only the front open; and a large power-driven fan in the back of the hood produces a strong draft, thereby drawing the color spray away from the operator, and blowing it into the outer air through a chimney opening. An excellent type of fan for this purpose is one having a diameter of 16", taking about 1/10 of a horse power to operate, and handling approximately one thousand cubic feet of air per minute through the hood. As all of this air is drawn away from the face of the operative, it is not possible for any of the fine spray to permeate the breathing zone.

In former years many of the mechanical installations designed for the protection of the tinters were inadequate. Either the hood was of improper construction, the fan was too small, or the opening through which the fan discharged its air was not large enough to accommodate the quantity. However, the Department's installations give satisfaction, and there is no sound reason why this class of work should not be stripped of every hazard.

Digitized by Google

The English regulations require that no shortsighted person shall be employed in glazing, or color blowing, unless wearing suitable glasses; and it is obvious that regulations of a similar character should be enforced generally throughout the trade.

PORCELAIN MANUFACTURE

The manufacture of porcelain, which is now used in hundreds of ways, is one of the important and growing industries of our State. Large numbers of women are employed in this business, which renders it especially imperative for those entrusted with the work of safeguarding the welfare of factory operatives to provide safe and sanitary working places. Several classes of work performed by female employes in porcelain plants have, until recently, been performed under very dusty conditions; notably fettling, blowing and brushing ware.

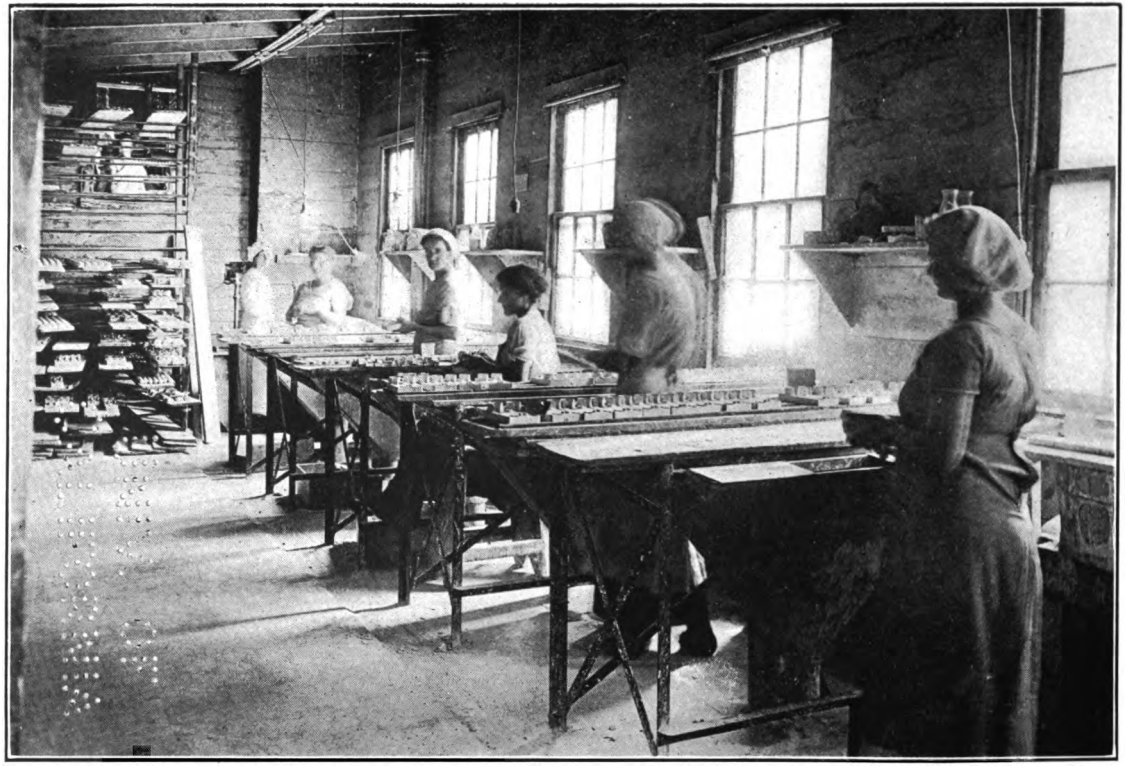
Porcelain articles are fashioned in hand power presses, designed for that purpose; and the article is then placed on a board (usually 6′ long and 1′ wide) and placed in the stillage to dry. In most plants it lies in the stillage for a considerable length of time, so that large quantities of dust collect on the board. This dust is usually removed from the board by means of a hand bellows, which emits a strong blast and raises a cloud of dust in the face of the operatives, and, in addition, fills the air of the room.

Until recently the bellows method was a trade practice in all porcelain potteries; but recently a type of dustroom has been constructed about eight feet long, eight feet high, and seven feet wide, with a door at one end, through which the porcelain (arranged in tiers on a large rack) is wheeled, and compressed air from the end of a hose effectively blows off all the dust. A steel plate 40″ exhaust fan, with an inlet opening into the other end of this dust-room, provides a strong suction that removes the fine dust as rapidly as it is made.

The fettling of ware (which is accomplished by means of a small tool that scrapes off the thin edge or inner holes of the porcelain) is another operation that embarrasses with dust. In some plants fettling is done by means of cotton buff wheels, located in specially constructed hoods provided with strong mechanical exhaust, which effectively takes away the fettling dust.

The third operation that formerly contributed to the general inconvenience of operatives in porcelain plants was the brushing

Digitized by Google



Porcelain-ware. Group of fettling tables equipped with mechanical exhaust dust control.

Digitized by Google

UNIV. OF
CALIFORNIA

Digitized by Google

operation, performed by the operatives who removed, by a violent brushing motion, excess glaze on parts of the porcelain articles where it is not required. This operation can now be performed on especially constructed tables, equipped with mechanical exhaust draft to remove the particles brushed from the ware.

A porcelain manufacturer has declared that the activity of the Department in devising dust-removal methods in this particular (while imposing some burden of expense) has been a positive benefit, by reason of the fact that it is now possible to keep the porcelain plants cleaner, while the work is more expeditiously performed; and a much better and more permanent class of help can be employed.

In addition to the issuance of orders requiring the installation of dust control systems in porcelain plants, the Department has also required them to install and maintain clean sanitary lunch and dressing rooms; washing arrangements consisting of hot and cold water, on a basis of one tap for each five persons employed; sanitary bubble drinking fountains with pipe coils so arranged that they can be ice-cooled in summer; and clean inside toilets, separated for the sexes, and vestibuled in accordance with detailed plans submitted by the Department for that purpose.

FLINT DUST

While lead poisoning has inflicted suffering in the ranks of the worker, "leading" in the potteries is not to be compared to the tragic results that have arisen from the presence of great quantities of flint dust; and the additional hazards arising from bad air, improper sanitation, and general lack of good housekeeping throughout the trade. Tuberculosis is conceded to be the great scourge of the potter. The presence of irritating dust in a pottery is of most serious moment; equally important to the employee, the general public, and ultimately to the employer; for in the last analysis, illness that causes loss of economic power contributes to the burden that must be borne by all wealth-producers alike.

In china potteries, biscuit-ware is bedded in layers of flint; which, when handled, produces clouds of fine penetrating dust. This constitutes a serious menace to the lungs of the kilnman bedding the ware, as well as to the lungs of the kiln drawers; the

Digitized by Google

latter of whom take the ware out of the kiln, dump the saggers into the barrel, and (by knocking the ware on a table) loosen the flint from the ware. The dust problem involved in sifting flint, bedding ware, dumping saggers, and cleaning ware by knocking, has always been largely mechanical. But never having been solved in any country, no beaten path could be pursued by the experts of the Department in meeting it.

After an investigation covering several years' time, and careful analysis of the physical conditions of individual plants where the flint hazard existed, plans were prepared and submitted to one of the largest china ware potteries in the State, which were designed with a view of eliminating the flint dust evil. As a result, bedding, dumping saggers, and flat ware knocking (which had heretofore been done in the open by operatives, surrounded by white clouds of dangerous dusts) will in the future be done under mechanical exhaust. The installation decided on by the Department (costing several thousand dollars) has been completed in part; and it is confidently expected by all persons concerned that it will so control the dust as to render it innocuous to the worker.

The installation of this mechanical device requires a considerable change in the working methods of operatives affected. Formerly flint was sifted in a mechanical sifter without the aid of exhaust. This flint will now be sifted in an especially constructed machine, under a powerful exhaust current that will take away the particles which formerly injured the workers. The bedding tables were formerly constructed of loose porous boards, and were not built with the idea of minimizing any of the dangers of the work. The tables that are to be used in conjunction with the exhaust installation are constructed of metal. All flint material at the point where the bedding is performed is contained in a metal box; and metal hoods with exhaust draft are placed at the points where the bedding takes place, to draw the dust away from the breathing zone of the operative.

Formerly the kilnman carried the flint from a loose type of sifting machine to his rickety board bedding table; and the loose jointed barrel that shed flint at every jar, thereby contributed largely to the bad housekeeping which was a glaring evil in pottery management.

It would be difficult to determine the number of workers who have lost health, or, in aggravated cases, life itself, by exposure

Digitized by Google

due to the old-fashioned methods of bedding and flinting ware; but the hazardous nature of the employment has been recognized for a long time by those employed in the pottery industry.

FLINT MILL—While kilnmen, kiln drawers, and laborers employed in biscuit kiln sheds are largely exposed to flint dust, theirs is not the worst case of flint dust exposure. Those persons who are employed in the flint mills proper are working in an atmosphere so charged with flint dust that it is inconceivable that human life could long exist in such plants.

It has been stated, on no less authority than the owner of one of the larger plants in this State, that a steady rotation of workers is desirable; and that the usual length of time for a worker to stay so employed is about three months.

CRUSHING—The process of handling the material is rather simple; the flint rock being delivered at the mill in small pieces, where it is ground into sand under a crusher (commonly known as a "Dutch Chaser," consisting of two large stone wheels revolving steadily on a vertical shafting). Formerly this grinding operation was done in an open pen, from which great clouds of fine dust arose, penetrating all parts of the flint mill. After going through the "Dutch Chaser," the sand is shoveled into a cup conveyor, whereby it is carried up to another level; going thence into a large storage container, from which it is wheeled in dump carts to a point above large revolving steel cylinders, into which it is dropped so that it may be further ground to a fine powder.

BALL GRINDING—This process of disintegration is accomplished by means of ball grinding. The grinding balls are flint stones smoothly worn, and the action of the ball and the steel cylinder soon reduces the flint to a fine powder. At the end of about five hours a "Blow-off" takes place, and the flint is sifted through a fine screen into an open pen. A mechanical dust controlling system has been installed in one of our larger mills, which by completely enclosing the crushing, conveying, and final grinding operation, eliminates the dust completely. In addition to this, it is hoped that an agreement may be reached by the flint mill manufacturers and the potters, whereby this fine flint may be so moistened that (in the process of handling it and conveying it to the potteries) no dust will arise. So far as is known, this is the

Digitized by Google

first time in the history of the flint grinding industry that a successful attempt has been made by means of mechanical dust control, to eliminate the harmful dust generated by the processes.

One of the interesting features of this mechanical dust control system is the installation of an air-washer, for the recovery of the flint dust that is drawn through the exhaust pipes, and which would (were it blown out into the open air) cause inconvenience to those in the immediate neighborhood. The strong current of air that draws the dust from points where it is generated into the exhaust pipes, passes through a curtain of water, and this water completely washes all the dust out of the air, leaving it in its original state of purity; while the sediment falls to the floor of the washer, and flows with the water into a receptacle designed for that purpose.

The installation of this washer (in connection with the mechanical dust-control system) seems to answer those arguments which formerly were used in support of the contention that even if the dust were controlled, and collected by means of an exhaust system, it could not be readily disposed of without inconvenience to those in the neighborhood of the plant.

PEARL BUTTONS AND PEARL NOVELTIES

The manufacture of pearl buttons and novelties was formerly an industry that was carried on in violation of all established laws of sanitation and hygiene. Pearl dust is sharp, cutting, and brittle, and when it enters the lungs, owing to its penetrating nature, it quickly finds a weak spot to attack; so that a fibroid type of phthisis is almost inevitably established which, in a majority of cases, develops after infection into tuberculosis. Medical investigators long ago pronounced pearl work hazardous and unhealthful, and it is so rated by industrial insurance companies today.

Formerly this industry was to a large extent carried on in the workers' homes, where it was impossible to guard against the clouds of fine dry dust generated by the many grinding and polishing operations; as well as against injurious dampness and slime resulting from the wet processes.

In the course of industrial evolution, the factory superceded individual workers, but they were collectively employed in dark

Digitized by Google

Porcelain-ware. Near view of fettling table, equipped with a mechanical exhaust dust control system.

Digitized by Google

UNIV. OF
CALIFORNIA

Digitized by Google

stuffy workrooms which, in the absence of enlightened State supervision, provided breeding places for disease.

In recent years the development of factory hygiene and mechanical dust control, together with enlightenment on the subject of workroom lighting and ventilation, has given rise to a policy of industrial supervision, that should rid this industry of the evils that attended it in the past.

The best pearl shells (those shedding liquid light after fashioning into buckles or ornaments) are not native products; they either come from West Australia, where the best are found (Sidney, Australia, producing a secondary grade) or Bombay, India, from which the cheaper kind is shipped.

CUTTING—In pearl button manufacture, the first operation is cutting. This is accomplished on a turning lathe, by pressing a rapidly revolving steel tool (with saw tooth cutting edge) against the pearl shell, and severing a portion the exact size of the cutting tool. This cutting is usually done wet; but in spite of this, a fine dust spray is made that can, and should, be removed by means of a suction pipe, with a bell-shaped end resting close to the point where the dust is made. To handle this dust efficiently, requires a suction in the pipe sufficient to raise 2″ of water in a U-shaped tube; and the pipe itself should have a diameter of 2″.

GRINDING—After the cutting tool has fashioned a disk the exact size required, both back and face of the future button has uneven and ofttimes scarred surfaces, that require smoothing and evening to bring them to the proper shape. To accomplish this purpose, the button is pressed against a rapidly revolving carborundum wheel and the rough surface is ground off, and the button brought down to its proper thickness. The backing and facing grinding operations produce great quantities of fine, flaky, penetrating dust that fill the air of the workroom; and in those factories where a mechanical exhaust control system of highly efficient character has not been installed, the operatives are covered with a white powder which makes them resemble the miller in the old-fashioned type of village flour mill.

BLOWERS—Recently, several Departments of Labor have taken cognizance of the great health-hazard involved in grinding operations producing this type of pearl dust; and have installed

Digitized by Google

exhaust control designed to carry it away before reaching the face of the worker. But, excepting New Jersey, no State has detailed standardized specifications, covering pipe sizes, hood construction, and all engineering questions involved in the amount of suction necessary to handle this dust. Such specifications (which have been issued for the information of pearl manufacturers, as well as the guidance of contractors who install this type of work) require that each grinding wheel where this work is carried on shall be provided with a hood covering the entire wheel, and leaving exposed only that portion where the pearl material comes in contact with the grinding surface; that a 3″ exhaust pipe shall be connected with this hood, and that a suction sufficient to displace 2″ of water in a U-shaped tube shall be generated in the suction pipe within 15″ of the hood; that the main suction pipe in all its cross-sectional points shall have an area 20 per cent. greater than the combined areas of all branch connections at each cross-sectional point; and that these proportions shall be carried throughout the system; and that the fan outlet shall have an area 20 per cent. greater than the combined areas of all connecting branches. Installations in strict accordance with these specifications afford absolute protection to the health of operatives; and moreover, the Department now has under consideration detailed plans as to the construction of steel safety hoods to cover grinding wheels, so that the person of the worker may also be protected from injury in case of a grinding wheel bursting.

Safety Hoods—The grinding wheels used for this class of work are of the carborundum type, 10″ in diameter with a 2″ face, and turn at a rim speed of approximately 4,500 feet per minute. It may be readily seen that in the case of a wheel bursting (and all made wheels are liable to burst without warning, or apparent reason), the position of the operative working in close proximity to the wheel would be precarious; and the hood constructed to meet the shock produced by a carborundum wheel bursting when traveling at such a high velocity, must be rigid in all its parts, and possess great tensile strength. When the Department began its investigation relative to providing safety hoods for these grinding wheels, it was found that no manufacturing concern was making a safety hood suitable for this kind of work. As a consequence, the engineering force of the Department has been obliged to give

Digitized by Google

this their attention, with the result that tentative details have been decided on affording ample protection for this class of workers.

DRILLING—After the button has been properly backed and faced, it is operated on by a machine that drills holes in the centre, through which the thread is drawn. The holes made by the drills are then countersunk or rimmed. This drilling operation, with the later countersinking or rimming, while not making such large quantities of dust as the backing and facing operations, still produces it in quantities sufficient to necessitate mechanical exhaust control. We require a 2″ suction pipe, with a bell-shaped end that must rest close to the point where the drilling and countersinking is performed, and suction sufficient to raise 2″ of water in a U-shaped tube must be generated in the suction pipe within 15″ of the bell-shaped end.

TUMBLING—After the countersinking operation, the buttons are rolled in pumice to make them perfectly smooth, and are then placed in a weak solution of muriatic acid and water, and tumbled for a number of hours until all foreign matter has been washed away and they are ready to take a polish. They are then put in a revolving drum with sawdust, and tumbled until the beautiful lustre so famaliar to users of pearl buttons is obtained.

The foregoing processes, through which pearl buttons pass in the course of manufacture, indicate no especial point involving difficulties of dust control that cannot be amply met by an application of mechanical exhaust. The principal difficulty in the past has been that Departments of Labor, who have essayed supervision of such dust control, have not outlined specific and definite methods, and have not provided the engineering data necessary to the guidance of contractors called on to install mechanical exhaust control systems. It is never safe to leave the question of pipe sizes, hood construction, fan pressures, or other specific engineering questions to the decision of conflicting and competing contractors. Neither is it fair to the manufacturer to compel him to install expensive mechanical dust control, and then leave the value of the installation (which must be measured by its efficiency) to the judgment of the contractor, or constructors, who may be ignorant of the engineering laws that govern these matters. New Jersey has sought to avoid this error by standardizing all installations of a certain character; and then having each in-

Digitized by Google

stallation an exact duplicate in efficiency of every other installation of a similar type.

LITHOGRAPHING

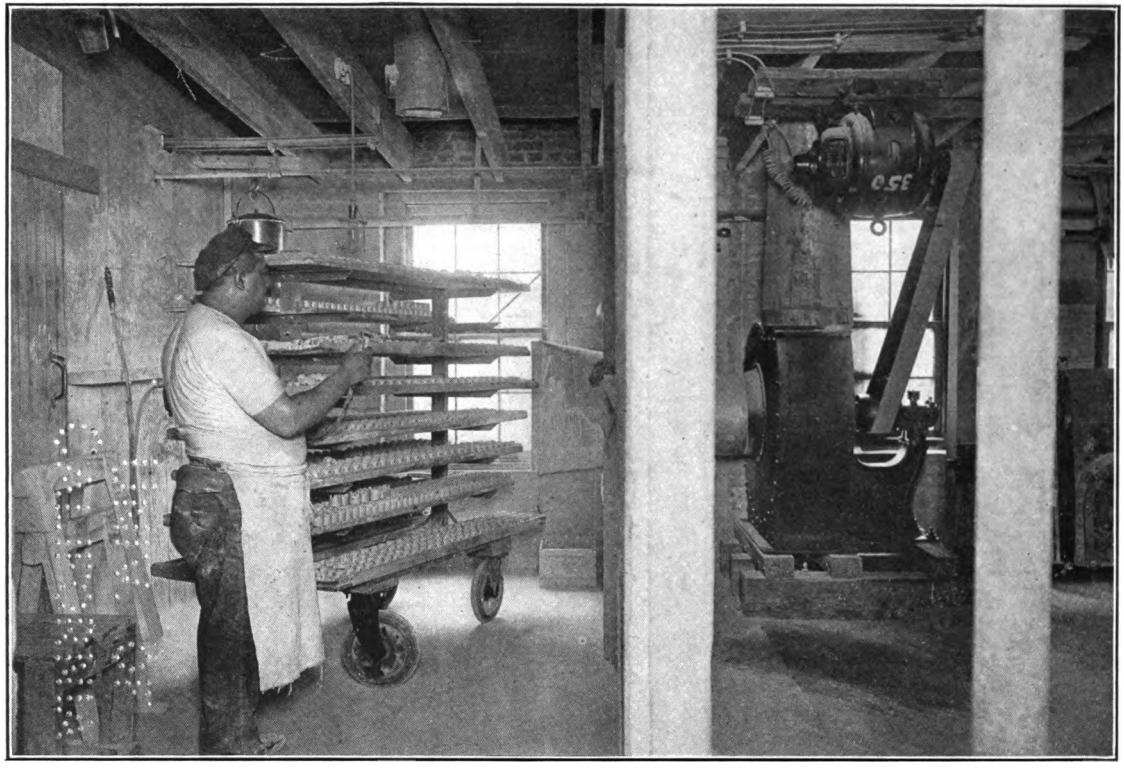
The art of the lithographer (by reason of the use of compounds of a nature harmful to health in the color depositing and brushing processes) needs careful supervision from the standpoint of ventilation and hygiene. Experience has shown, however, that these dangers, if properly surrounded with mechanical devices to control the dust generated, need cause no serious injury to the physical well being of persons employed.

In lithographing, a design is first worked out on paper by an artist with his brush. It is then turned over to the transfer department and worked out in wax on a stone slab. A solution of nitric acid is applied to the stone slab, and those parts not protected by the wax are eaten away, leaving the design on the surface raised above the plane of the slab. The stone slab is then placed in a steam press, and varnish is applied by means of rolls to the raised design. The paper sheets on which it is desired to print this impression are then run through the press, and a varnish impression of the design is made on the sheets.

Color Depositing—The sheets are next run through a color depositing machine, which deposits a colored dust over the entire sheet. The sheet is then brushed by hand, and all the color, except that which adheres to the varnish design, is brushed off.

Hand Brushing—The brushing operation stirs up a great quantity of dust, and proper consideration of the health of the operatives demands it shall be performed under a strong exhaust. The Department therefore requires a glass enclosure with a raised front, to enable the operative to handle the work without interference, and a sufficiently strong mechanical exhaust draft to carry the dust away from the breathing zone. In front of each operative who is bushing sheets in this glass enclosure, is placed a 5″ suction pipe, in which is generated an air movement sufficient to raise 1½″ of water in a U-shaped tube. In former days, and before dust control by means of mechanical exhaust drafts had reached its present stage of development, many cases of poisoning occurred, and serious injury to health was suffered by those (espe-

Digitized by Google



Porcelain-ware. Blowing dusty ware with compressed air. Mechanical exhaust dust control protects the workers from dust.

Digitized by Google

Digitized by Google

cially female operatives, who are more susceptible to poisons than male workers) following this trade.

FLOUR DUSTING—After brushing, the sheets are dried, for the deposited material is in a moist condition, and they are subsequently run through a flour-dusting machine, to take off the scum caused by varnish and color. The Department requires that this operation be conducted in a machine as tightly enclosed as the nature of the work will admit, and the powdery scum and flour dust, which otherwise would fly in the face of the worker, is carried off by mechanical exhaust furnished by a 5″ pipe.

MACHINE BRUSHING—The final operation is performed in a brushing machine, where the last trace of loose color or foreign matter is brushed away. The specifications require that this machine shall also be tightly enclosed, and that efficient mechanical draft through a 6″ pipe be provided to handle the material brushed away.

SUMMARY—When it is understood that every color must be run on each sheet separately, that as many as nine colors may be used, and that these various operations are necessary each time a color is applied, it will be readily apparent to those famaliar with the oxides employed, that unless absolute and positive control of the dust is assured, the health of the workers will suffer. The Department feels that the New Jersey standards for dust control in the lithographing process will compare favorably with methods employed in the few States where the subject has been given consideration. In designing its exhaust system to so control the dust generated as to keep it away from the breathing zone of the worker, the Department considers it essential to success to enclose the working point, and to have the draft sufficient both in volume and velocity. The Department has accomplished this purpose by using its standard glass enclosure on the brushing tables, and by regulating the size of the branch pipes and of the main suction pipe and fan.

RECAPITULATION

The work of the Department in developing in concrete form those features of the factory laws investing the Commissioner of Labor with authority to safeguard the physical well-being of

Digitized by Google

thousands of factory operatives, who were formerly employed in this State under conditions where they were exposed to uncontrolled industrial dust, noxious fumes, and excessive heat, have led it into a varied field of industrial activity.

In this and other countries, the development of a policy of practical sanitation and hygiene has been of slow growth, and has (in all cases where useful achievement has resulted) been born from endeavor, investigation and experiment. For a number of years, the best thought in departmental circles devoted to trade-investigation has gradually led to the conviction that every industrial enterprise (heretofore harmful and hazardous, because of peculiarities connected with it) may be made safe and healthful by the application of intelligent supervision; and that industrial tuberculosis—a scourge that afflicted one out of every three employes in the ranks of the worker for generations—may be entirely eliminated if use is made of the mechanical and medical information that is a product of the last decade.

The Department, in its work of enforcing the dust, heat, and fume act, has proceeded on the theory that the proper place to control these is at the point where they originate; and that if this cannot be done by natural or mechanical means, then factory construction (even if it requires extensixe structural changes) should be made to conform to positive standards which will reasonably insure the safety and health of persons employed. At one time the thousands of buffers and polishers in this and other States developed such marked tubercular tendency as to cause their occupation to be rated by many of the large life insurance corporations as especially hazardous; and where insurance was issued to such employes, an almost prohibitive premium was attached to the policy.

The Blower Law in New Jersey has been operative since 1904; and during that time (without known exception) all buffing, polishing and grinding wheels have been equipped with efficient mechanical exhaust systems which remove the injurious dusts generated before they have an opportunity of being breathed into the lungs of the operative. Judging from the reports made by the Labor Unions of this State, the occupation of a polisher has been removed from the hazardous list.

Digitized by Google

During the past year the following special installations on fumes, dust, gases, and excessive heat, were made on orders issued by the Division of Hygiene and Sanitation of the Department:

468 buffing and polishing wheels.
108 woodworking machines.
227 sizing machines in hat factories generating steam.
42 pouncing machines in hat factories.
40 dusting machines in the fur preparing industry.
102 linotype machines.
11 stereotype machines.
2 lithographing processes.
30 pearl buffing machines.
18 leather buffing machines.
159 miscellaneous points where excessive heat and fume were generated.

STEAM ENGINE AND BOILER OPERATORS' LICENSE BUREAU

The work of this Bureau began on November 1, 1914, with two members of the board appointed by the Commissioner of Labor (after due examination and approval of the Civil Service Commission, as designated by the law) these members being A. L. Case, of Plainfield, N. J., for a short term ending May 1, 1915; and George McQuilken, of Camden, N. J., appointed for the second term, ending May 1, 1916. On January 28th, Martin J. Hickey, of Jersey City, successfully passed the examination, received the approval of the Civil Service Commission, and was on the same day appointed a third member of the Board for the term ending May 1, 1917. On February 1, 1915, Mr. George McQuilken tendered his resignation, which was accepted by the Commissioner of Labor. On May 1, 1915, A. L. Case was reappointed for the full term of three years, ending May 1, 1918; and on August 1, 1915, Mr. Joseph Scott, of Whippany, N. J., was appointed to fill this vacancy (caused by the resignation of Mr. Geo. McQuilken) he having previously been examined and approved by the Civil Service Commission.

On November 1, 1914, this Division was open for business, and for the distribution and receipt of applicantions for license. During the months of November and December, constituting the first sixty days of the organization of this Board, applications were received for licenses without examination (by request of employer, as provided by the law) and during this time 12,200 applications were received.

Digitized by Google

The large volume of business developed, and the inadequate facilities for carrying this work out, delayed the placing of all these forms on record until the early part of May, when the work of actually issuing licenses was taken up. This required the constant efforts of the office until the first of September, before all of the licenses were issued on original applications received previous to the first of January. During this interval a large number of applications for license were received in this office, the issuing of license upon which depended upon examination; and it was not until the first of October that this work could be prosecuted.

During the month of October, or the last month of the fiscal year covered by this report, an examination was held at Cape May Court House on October 28th, in addition to the monthly examinations which were held at the State House on the first Wednesday of June, July, August, September and October, making six examinations in all, at which 82 applicants appeared for examination. Of this number 79 were granted license, and 3 were held over for another examination, not having satisfactorily passed, and one were absolutely refused.

The total amount of fees received with applications for license without examination, and from which licenses were granted, was $24,400, which was turned over to the office of the State Treasurer in various sums, as these applications were placed on record; the final payment being made on August 24th. On October 30th, $153.50 was also placed in the hands of the State Treasurer, the same being in payment of original licenses and transfer for license, made on account of examinations, and licenses issued by this process during the month of October, making a total sum transferred to the State Treasury, during the fiscal year ending October 31, 1915, of $24,553.50.

Practically the entire appropriation of $5,000 made by the Legislature for this Division, and also the supplemental appropriation of $4,000, amounting to a total of $9,000, was used in the prosecution of this work, which sum, however, was entirely inadequate for the necessities; and it was almost entirely due to this fact that the progress made by this Board was so apparently behind what it should be, and would have been otherwise. We ask that careful consideration be given in the future to financial requirements of this Division, bearing in mind that it has de-

Digitized by Google

veloped the fact that this Division is capable of more than paying all necessary expenses for its operation.

CHILD LABOR REPORT

The work of enforcing the Child Labor Laws, as amended by the Legislature of 1914, has progressed smoothly. Considering the natural difficulties (always encountered in making an amended law familiar to a public which has become thoroughly acquainted with the working of the original law) we have reason to be well pleased at the results obtained in this direction in the past sixteen months, during which the present Child Labor and Compulsory Education Laws have been operative.

At the time of making out the Annual Report for 1914, our records showed that from July 1, 1914, to November 1, 1914, something like 4,000 sets of proofs had been passed by this Department as complying with the provisions of the above-mentioned laws.

The total number of proofs approved by the Department of Labor from November 1, 1914, to November 1, 1915, is 12,783. These papers have been received from about 175 different sources, representing county, city, town and township school officials, designated by local Boards of Education to issue Age and Working and Age and Schooling Certificates, in conformity with the provisions of Chapter 223, Laws of 1914. During the past year the Department approved 1,925 sets of proofs from Newark; Jersey City, 1,048; Camden, 665; Paterson, 650; Passaic, 586; Trenton, 504; Bayonne, 424; West Hoboken, 304; Elizabeth, 261; Garfield, 205. It will be seen that the proofs sent in from the above ten cities total 6,572, or a little more than half the entire number sent in from the whole State. These figures are exclusive of Age and Working Certificates, which have been issued in a proportion of about one in ten for the entire State; although in some cities (notably, Trenton, Newark, Camden, Plainfield and Garfield) the percentage to the number of Age and Schooling Certificates issued would be considerably higher.

The advocates of the present law were of the opinion that it would tend toward a decrease in child labor, which, at first sight, does not appear to be shown by the above figures. It must be borne in mind, however, that we are now passing on certificates

Digitized by Google

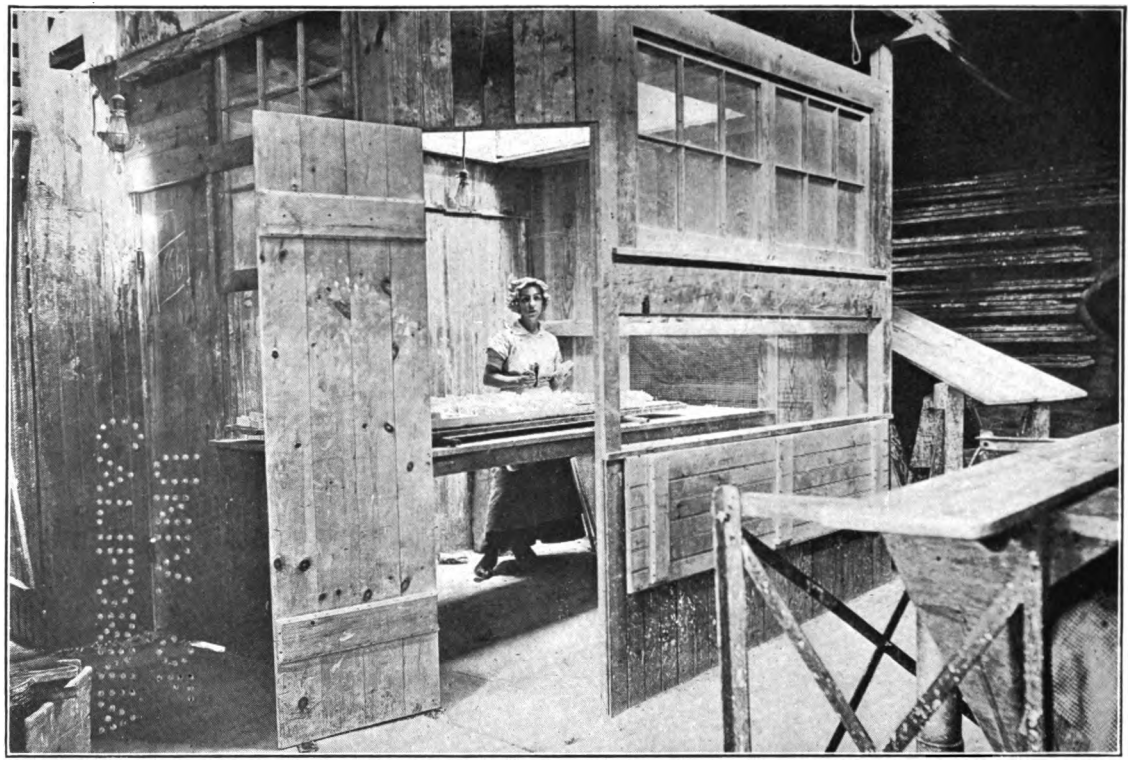
permitting employment in mercantile establishments, as well as manufacturing establishments, which was not the case under the old mercantile law. While that required the employer to have on file proof of age for every minor in his employ under the age of sixteen years, it did not require that these proofs be sent to the Department of Labor at Trenton. The reports received from the inspectors (on their inspections of factories throughout the State), as well as the statements made by some manufacturers, lead us to believe that there has actually been a decrease in child labor in manufacturing establishments. Many factory owners now elect to employ children over sixteen, in order to obviate the necessity of having on file the Age and Schooling Certificates required by law; and also because such children are not governed by the provisions of the eight-hour law.

An analysis of the records at this office indicates that, during the past year, more children started to work at fifteen years, or over, than at fourteen. Several hundreds of records taken from various places in the files give the following figures: in a given hundred, 48 were over fifteen years of age, 45 were over fourteen, and 7 were past sixteen. This is a general average, the figures running as high as 49 in a hundred over fifteen in some cases, and down to 47 in a hundred over fifteen in other cases.

During the past fiscal year, 105 discharges were ordered by this Department, 49 in factories, 5 in bakeries, and the remaining 51 in mercantile establishments. Of this whole number, only 28 were discharged as being under the legal age to work; 2 in bakeries, 12 in factories, and fourteen in mercantile establishments. The bulk of the discharges issued during the past year were because of the fact that the requisite Age and Schooling Certificates were not filed; and because of the employment of children under sixteen more than the eight hours a day and forty-eight hours a week provided by law.

The factory situation, as regards the observance of the Child Labor and Compulsory Education Laws, seems satisfactory; but the Mercantile Law, being a more recent one, is not so generally understood. It will require more educational work being done in connection with the enforcement of the Mercantile Laws as they affect children, and especially in the regulation of the hours of employment of such children, before all the desired results can be secured under this law.

Digitized by Google



Brushing Porcelain-ware under the protection of a mechanical exhaust dust control system.

Digitized by Google

Digitized by Google

Under the old Child Labor Law, the Department of Labor was undoubtedly handicapped by the fact that the limited number of inspectors at its disposal could not exercise the close supervision which the local school authorities, and truant officers are able to maintain over the children in their immediate districts. That this has undoubtedly been of great advantage in the successful operation of the present laws, the small number of discharges of children under the legal age throughout the State will attest. In connection with the issuance of these discharges, whatever the reason, the policy of the Department in invariably sending a notice of the discharge (containing the name and address of the child, and setting forth the name and address of the employer) to the local supervisor of school exemption certificates has been of immense value. This has resulted in having the children returned to school where they were under the legal age at which they might work, and in causing the issuance of the Age and Schooling Certificate for filing with the employer, when its absence was the cause of discharge.

We are also indebted to several school superintendents for calling our attention to irregularities in places of employment in their vicinity; thus enabling us to send our inspectors there to correct the conditions complained of, all of which is in line with the work of the Department in regulating and safeguarding the employment of minors. In addition to this, in every case where the discharge of a child was ordered because an Age and Schooling Certificate was not filed, we also sent to the employer, with the discharge notice, the reason therefor, and the name and address of the local supervisor of School Exemption Certificates, so that a compliance could be made with the requirements of the law.

The Department of Labor has endeavored, in every way possible, to bring about not only the enforcement of the Child Labor Laws, but also the Compulsory Education Laws, in so far as they apply to the issuance of Age and Schooling Certificates and Age and Working Certificates permitting employment. The submitting of the proofs on which these certificates are issued, and their acceptance or rejection by this Department, have materially helped to a fuller and more comprehensive understanding of both laws, as we have invariably given in detail our reason for not accepting any proofs sent, stating wherein they deviated from the requirements of either law.

Digitized by Google

The officers issuing these certificates will acknowledge that they have been greatly aided in their administration by the instructions and co-operation accorded by this Department.

An educational campaign has been carried on by us along the lines of interpreting laws, giving information, and generally in bringing the operation of this enactment to a more comprehensive degree of perfection.

PROTECTION OF WOMEN

The safeguarding of the physical and moral well being of women workers is a subject that has received serious consideration from all students of social economy. The general trend of advanced public opinion, whether entertained by the sociologist, liberal minded employers, or persons whose views are shaped by direct contact with this class of labor, has favored the shortening of the work-day to a point to be determined by reason and scientific industrial development, as well as by consideration of those promptings of humanity which inspire us to relieve the weak from burdens beyond their strength.

In some instances the working population of whole factory communities, by reason of excessive labor conditions, has suffered such physical and moral degeneration as to attract the serious attention of the Government. In most of our States, regulations of the work-hours limiting the employment, and supervising the workplace of female operatives, have long been a feature for Legislative activity; and while New Jersey has not surpassed her sister States in legislation to this end, she has followed the more conservative of them.

In my last report, it was pointed out that the duration of the legal workday for women in New Jersey was in excess of that which prevails in several of the large industrial States; and I feel that at this time emphasis should be given to this fact, so that the attention of the Legislature may be directed to it. In this age of improved machinery, specialized methods of production, and of working capacity enhanced by efficient management, the long work-day of the past seems unquestionably severe.

The activity of the Department during the past year in discharging its responsibility to the thousands of women workers has been expended largely in enforcing the provisions of the law limit-

Digitized by Google

ing the hours of labor to ten per day; providing washing and dressing facilities; and (in cases where the nature of the work requires) lunch-rooms; clean toilets, screened and vestibuled; rest rooms; seats for women workers where the nature of the work permits it; and general supervision to insure proper ventilation, safety from dangerous machinery, and the provision of clean and wholesome surroundings for employes.

REPORT OF AMERICAN ASSOCIATION FOR LABOR LEGISLATION, MAY 1, 1915

	Hours per Day (Industrial).	Night Work Prohibited.	Hours per Week.
California	8		48
District of Columbia	8*		48
Oregon—Office	8 1-2	Stores	51
Mercantile	8 1-3	Factories	50
Industry	9	Laundries (After 8.30 P. M.)	54
Arkansas	9		54
Maine	9		54
Missouri	9		54
Nebraska	9		54
New York	9*	Manufacturing, 10 P. M. 6 A. M. Mercantile, 10 P. M. 7 A. M.	54
Utah	9		54
Minnesota—Manufacturing	9		54
Mercantile	10		58
Arizona	8		56
Connecticut	10		55-58
Delaware	10		55
Massachusetts	10*	Factories, 10 P. M. 6 A. M. Textile, 6 P. M. 6 A. M.	54
Michigan	10		54
New Hampshire	10 1-4		55
Ohio	10		54
Pennsylvania	10*	Manufacturing, 10 P. M. 6 A. M.	54
Rhode Island	10		54
Tennessee	10 1-2		58
Texas	9		54
Vermont	11		56
Wisconsin	10		55
Wyoming	10		56
New Jersey	10*	(Formerly 55)	60

* Work limited to six days a week.

SUMMARY OF MERCANTILE WORK

Owing to the necessarily limited number of inspectors detailed to this class of work, it has been impossible for the Department to discharge fully its duty to the mercantile employes placed within its jurisdiction. When the fact is borne in mind that in Newark alone over 4,000 establishments are listed as falling within the provisions of the Mercantile Law, it is apparent that only an augmented force of inspectors could hope to even make one thorough inspection yearly. Nevertheless, a campaign of education has been carried on by the Department as thoroughly

Digitized by Google

as its handicaps permitted, and 532 inspections have been made, 307 orders issued, and 491 items issued as follows:

Child labor, 66; protection to employes, 1; sanitation, 87; seats for women, 6; ten-hour law, 324; ventilation, 2; wages, 5.

There have been twelve suits instituted against mercantile establishments for violations of Chapter 216, Laws of 1912.

BAKERY AND CONFECTIONERY REPORT

One of the important branches of the work of the Department is the regulation of bakeries and confectionery establishments. A discouraging feature of this work is the fact that such establishments are apt to revert to unsanitary conditions soon after they have been regulated by the activities of the Department. An effort has been made to overcome the difficulty by requiring each bakery and confectionery establishment to be licensed by the Department, which license may be revoked for cause upon the order of the Commissioner of Labor.

The Department has insisted upon a high standard of cleanliness and sanitation before licensing these establishments, and by systematic inspection is endeavoring to secure their continuance in proper conditions.

Among the regulations specified by this law are included the following:

The screening of all places to prevent the entrance of flies and other insects between the first day of April and the thirty-first day of October.

The prohibition of expectorating within the building or room used for the purposes of a bakery or confectionery.

Also the prohibition in such places of smoking, snuffing, or chewing tobacco. Notices prohibiting these two last practices are to be properly posted.

The structural conditions of the bakery are clearly outlined, specifying that the floors must be of an impermeable construction of wood properly saturated with linseed oil, of cement or other suitable material.

The side walls shall be plastered, wainscoted or ceiled with metal or lumber, and kept in a sanitary condition at all times.

Absolute cleanliness must be maintained and receptacles provided for the storage of ashes and garbage.

The law further specifies that sleeping apartments must be separate from the rooms used for the purpose of a bakery or confectionery.

Also that suitable toilets shall be provided in such a manner as not to open directly into the rooms used for bakery purposes.

The operatives are required to wear outer clothing while employed in such places, which shall be made of washable material, and kept clean at all times, and that the street clothing of these operatives must not be kept in the workrooms.

Digitized by Google

A very excellent provision prohibits persons having certain diseases from being employed.

Another section of the law regulates the conditions for storing, delivering and exhibiting for sale the manufactured products of bakeries and confectioneries.

Another excellent provision of this law is the one that prohibits the use of cellar bakeries unless they were in use as such at the time of the passage of the Bakery Law (July 4, 1905).

Under this section of the law, the Department is endeavoring to eliminate the more unsanitary cellar bakeries, and generally raise the tone of such bakeries throughout the State. A large number of bakers have been compelled to increase the height of their ceilings, and conditions have been otherwise greatly improved.

The operation of the license feature of the law has been satisfactory, and has provided methods for handling this important feature of our work. A fee of one dollar is required for obtaining a license, and the question of requiring a larger and annual fee is one which is worthy of consideration.

We desire to acknowledge assistance in the enforcement of the bakery regulations from our volunteer inspectors; and it is our purpose, through these inspectors, and by co-operation with such local organizations as the Housewives' Leagues and the Women's Clubs, to endeavor to secure a local sentiment favorable to the enforcement of the bakery regulations. Assistance has also been rendered by the Confectioners' Association.

Total inspections made, 2,562; total orders issued, 1,283; total items issued, 4,195, as follows: Cleanliness, 1,847; elevator, 4; fire alarm, 3; fire escape, 4; fire-proofing, 4; orders to discontinue, 19; orders to increase height, 13; orders to secure license, 309; protection of machinery, 83; protection of employes, 138; sanitation, 1,771.

There have been 472 licenses issued during the last year, and $472.00 turned over to the State Treasury covering the license fees received for the above licenses. It has been necessary to bring suit for operating without a license in three cases during the past year.

MINES AND QUARRIES

On September 14, 1915, an Inspector of Mines and Quarries was appointed in this Department. Since his appointment he has been chiefly occupied in familiarizing himself with the work of the field he is to cover. He has, however, sent in a list which

Digitized by Google

contains eight mines in the State, four of which he has covered by regular inspection. He has also sent in a list of quarries, containing fifteen quarries, five of which he has covered by regular inspection. In addition to the mine and quarry work, he has been given charge of the compressed air work. As many orders were issued as were essential for the preservation of the health and welfare of caisson operatives.

In addition to the above, the Structural Bureau has prepared a special set of maps, outlining the exact location of all the mines and quarries in the State of New Jersey; also noting the type of output of each one. With this information, the Mine Inspector will follow up all mines and quarries shown, and will report the activities of each one now operating. It is shown on the maps prepared that there are 21 iron mines, 46 limestone quarries, 19 granite quarries, 70 basalt quarries, 20 sandstone quarries, 3 slate, and 3 miscellaneous stone quarries, making a total of 182 mines and quarries to be investigated in the State of New Jersey.

For further information in regard to the maps, the Structural Bureau has prepared the following list giving the location of the above-mentioned mines and quarries:

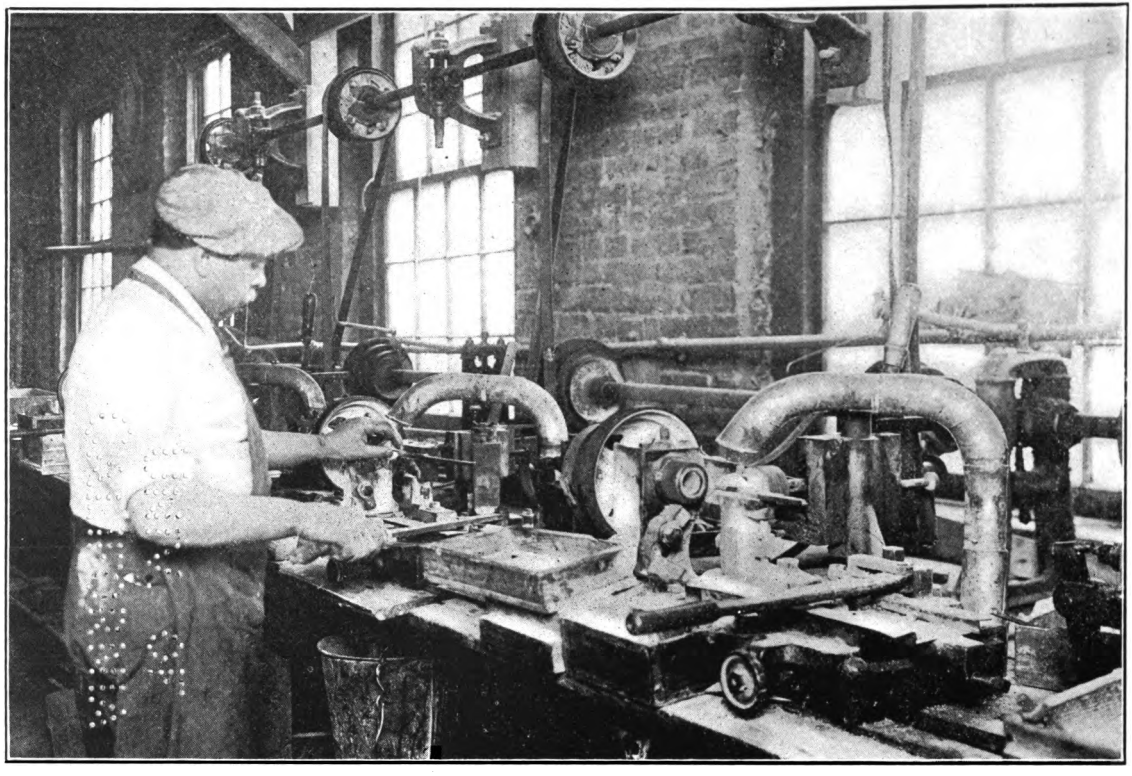
	Limestone.	Granite.	Basalt.	Sandstone.	Iron.	Slate.	Miscl.
Hunterdon County..	15	..	4	3	..	..	..
Morris County.....	1	13	2	..	13	..	..
Somerset County....	3	..	15	2	..	..	..
Sussex County.....	16	1	..	2	1 (Zinc) 2	2	1
Warren County.....	11	..	..	..	4	1	..
Passaic County.....	..	5	15	1	2	..	..
Bergen	..	..	5	4	..	..	..
Essex County.....	..	..	13	1	..	..	2
Union County.....	..	..	4	..	..	..	..
Hudson	..	..	6	..	..	..	..
Mercer County.....	..	..	6	7	..	..	..
Total.....	46	19	70	20	21	3	3

EMPLOYERS' LIABILITY

It may not be out of place to note at this time, that the Department of Labor has the past year, as during the two preceding ones, performed the clerical work associated with the study and observation of the Workmen's Compensation Act, as required of the Employers' Liability Commission.

During the past year we have secured reports of 7,080 non-fatal, and 268 fatal accidents, in connection with which every compensation settlement has been carefully reviewed, and every irregular case has been taken up by correspondence with the employer

Digitized by Google



Cutting Lathes used in the Pearl Industry. Equipped with mechanical exhaust dust control that protects the worker from dust generated by the process.

Digitized by Google

Digitized by Google

and insurance carrier, with the very gratifying result that almost all accidental errors, and those resulting from misinterpretation of the statute, have received correction, and the injured employee has obtained the additional amount due under the law. This work has involved second reports in upwards of two thousand cases; and analyzing the varied cases, and applying the compensation law to them, has required the exercise of expert knowledge of the statute; the existing rulings of the lower courts; and opinions filed by the Supreme Court. A service which we are very glad to have been able to render the Commission in aid of its study of the operations of the Compensation Act.

The Bureau of the Department of Labor, which has been performing this work, has to a degree been compelled to assume the functions devolving in other States upon administrative compensation boards. The actual pressing need of such supervision has virtually forced this work upon us.

A detailed report covering compensation matters will be found in the annual report of the Employers' Liability Commission for the year 1915.

The reporting of accidents is a matter which cannot be overvalued. Every report is carefully studied; and the various inspectors throughout the State are supplied with a record of every case involving conditions, of any nature whatever, permitting investigation. These records are systematically followed up with a view of eliminating as far as possible every condition responsible for industrial injury.

Each year we prepare a detailed compilation of the causes of accidents, which it is our hope to be able to publish in pamphlet form. This tabulation gives the machine, part of machine, device or condition responsible for each accident reported.

INSPECTORS AND OFFICE SYSTEM

There seems to be an opinion on the part of many people that practically anyone is capable of performing the duties of a factory inspector; whereas an analysis of his activities quickly demonstrates the fact that the calling should be looked upon as a special profession, requiring much study and experience. The orders enforced under the direction of the Department's inspectors represent an outlay of many hundreds of thousands of dollars. While

Digitized by Google

this aspect of the problem is of the greatest importance to the manufacturer, the responsibilities of the inspector in the matter of safeguarding the finances of the owner cannot be reckoned as superior to the responsibilities incident to the proper safeguarding of the life, limb, health and comfort of factory operatives. The Department cannot but deprecate the fact that, in spite of the serious character of an inspector's duties, the policy pursued by the State as to the value placed upon his services offers so little inducement to men of ability and ambition. In other industrial countries, factory inspection is looked upon as an occupation calling for especial training, and for an increasing scale of compensation based on the proof of increased efficiency. The day has passed for regarding the quantity of orders issued as the only test of ability in the inspecting field. The whole trend of contemporary Departmental organization is to ensure a standard of competence which shall measure up to the requirements of humanity, without detriment to the economic aspects of the industrial reforms involved.

STANDARDIZED INSPECTION

GENERAL—The following standardized procedure is followed by an inspector in making his survey of a factory building: The file number under which the factory is listed, and the name of the establishment is noted, together with a statement as to whether it is a corporation, firm or individual; the city, county and street are also specified. Under the heading of "Goods Made," the inspector advises the Department as to the material made or manufactured. The name of the owner of the building, his address, and the agent and his address are also noted on each inspection sheet.

EMPLOYES—Under the heading of "Employes" a record is made of the number of male and female operatives; the number of males and females under sixteen years of age; and the facts determined by the inspector upon investigation as to the filing of such Age and Schooling Certificates as are necessary for minors in accordance with the terms of the several acts governing the regulation and employment of minors under sixteen years of age. The number of employes on each floor is also noted, to determine if sufficient egress facilities have been provided, and measurements

Digitized by Google

are made to assure that the cubical contents of air space meet the requirements of the law. The number of employes is also required to determine the standard provisions for effective and adequate sanitary conditions. The names of the respective firms in a multiple factory are listed with their file number, if more than one tenant occupies a factory building.

CHILD LABOR—To assure compliance with the laws regulating what is designated as "Child Labor," an inspector notes the maximum hours per day and week that children under sixteen work; also he specifically advises if such operatives are employed contrary to law between the hours of 7 P. M. and 7 A. M.; he also notes if, in accordance with the statute, a register is kept for minors under sixteen years of age. As this Act prohibits children working about moving machinery, or cleaning same while it is in motion, the inspector remarks on the conditions which he finds prevailing in the respective establishments.

WOMEN'S HOURS—The 10-hour per diem law applying to women, which does not permit female employes to operate more than six days nor more than 60 hours per week, and which provides that a record of such hours of employment shall be kept, is covered by the inspector's report relating to women, as noted on the inspection sheet.

WAGES—Chapter 38 of the Laws of 1899 relating to wages being paid in cash, and either weekly or bi-weekly, is given attention by the inspector under the heading provided for that purpose.

POSTING ABSTRACTS—The Department, in accordance with the statutes, supplies the manufacturers gratuitously with abstracts of the Factory Law, and it is the duty of the inspector to remark if such abstracts are posted in a conspicuous place, together with a notice of the meal hours, the maximum number of employes operating in each room, the Workmen's Compensation Law Summary, and Fire Drill signs.

REPORTING OF ACCIDENTS—To comply with the Acts relating to "Liability and Compensation for Injury," the inspector reports if accidents are reported in accordance with the requirement of Chapter 95 of the Laws of 1911 and the supplements and amendments thereto; and he also notes for record the number of

Digitized by Google

factory accidents that have occurred since his last inspection, if any.

LIGHTING—Lighting conditions effective in the plant are noted to assure efficiency in the diffusion of artificial lighting. Unprotected gas brackets are not permitted when such a condition is inducive to fire hazards; and other lighting hazards, viz., kerosene lamps, etc., are reported.

HEATING—Heating conditions are specified; and if stoves are used, it is the inspector's duty to protect the front and sides with metal shields; or to recommend such non-combustible material as is best suited to overcome the hazard.

FIRE PROTECTION—Under the heading of "Fire Protection," it is deemed essential to note the number of stories in the manufacturing establishment; to advise whether the construction is brick, frame, concrete, mill construction or fire-proof; to specify the thickness of floors; whether or not they are in good repair; and to specify the distance from the first floor to the ground.

DOORS—Exit doors are reported upon as to the direction in which they open, and the fact is investigated if such doors are open during working hours, and if the same are fastened or locked.

EXITS—An important duty with which the inspector is charged is to specify the number of exists leading to a means of egress from the basement, and from each of the respective floors.

STAIRWAYS—The number of stairways is required, together with a description of their structural design, including the application of hand rails, and enclosure. Material of stairs is also specified; if doors are installed at entrances to enclosures; if said doors are fire-proof; and if they are controlled by fusible links.

FIRE TOWERS—Fire towers in factory buildings are noted as to number, entrances, stair construction and stair approach.

FIRE ESCAPES AND FIRE-PROOF DOORS—Fire escapes are recorded as to number and type; noted as to their compliance with the law; whether or not such fire escapes require painting to prevent corrosion; whether the approaches to fire escapes are cut to

Digitized by Google

the floor level; and the fact is specified if doors leading to fire escapes are fire-proof and of standard construction; if they open outwardly; and if egress fire escape platforms are unobstructed.

FIRE-PROOF WINDOWS—The fire-proofing of windows facing on and under the fire escape is noted on the inspection sheet, together with the fact as to their compliance with standard construction.

LADDER TO ROOF—A goose-neck ladder to the roof, if such is warranted, is also specified.

FROM FIRE ESCAPE TO GRADE—The question is covered as to the method adopted to reach the ground from the fire escape balcony, and the inspector reports if this condition is attained by continuous stairs, cantilever type, or balanced weight. If either of the two latter constructions prevail, it is the inspector's duty to be assured that they are kept in proper working order.

FIRE ESCAPE SUBSTITUTE—If escapes are not constructed in accordance with the present law, a description of the substitute is required.

PASSAGEWAYS TO FIRE ESCAPE—All passageways leading to fire escapes must be kept clear of obstructions, and this condition is noted and regulated.

EGRESS SIGNS—Specific signs furnished by the Department should be posted, showing where egress to fire escapes are provided.

FIRE PREVENTION (INFLAMMABLES AND EXPLOSIVES, HOW STORED)—Under the heading of "Fire Prevention," the inspector describes any processes involving the use of highly inflammable materials, volatile liquids or explosives; together with a statement as to the amounts used, and as to how the combustible materials are stored.

GAS VALVE SHUT-OFF—If gas is used, it is noted. The question is raised as to what provision has been made to provide a shut-off gas valve on the exterior of the building, and this fact is noted.

SIGNS PROHIBITING SMOKING—If smoking is prohibited, and if "No Smoking" signs are posted, the inspector so reports.

Digitized by Google

"No Smoking" signs are furnished gratuitously by the Department.

MAXIMUM NUMBER OF OPERATIVES—The inspector reports if the maximum number of employes is designated in each room, and if signs for this purpose, furnished by the Department, are posted.

VERTICAL FIRE HAZARD EXPOSURES—Openings in floors, shaft and belt holes, should be arranged so as to prevent the spread of fire from floor to floor. Violations of this requirement are noted on the inspection sheet.

FIRE-PROOF DOORS—The character of door openings is reported, to note if such doors are of fire-retarding construction.

RUBBISH DISPOSITION—The storing of rubbish in factory buildings is prohibited, and this is noted, as well as the manner in which rubbish is disposed of.

MATCHES—The subject of the use and storage of matches is also noted.

CELLAR—The condition in which the cellar or basement is kept is noted.

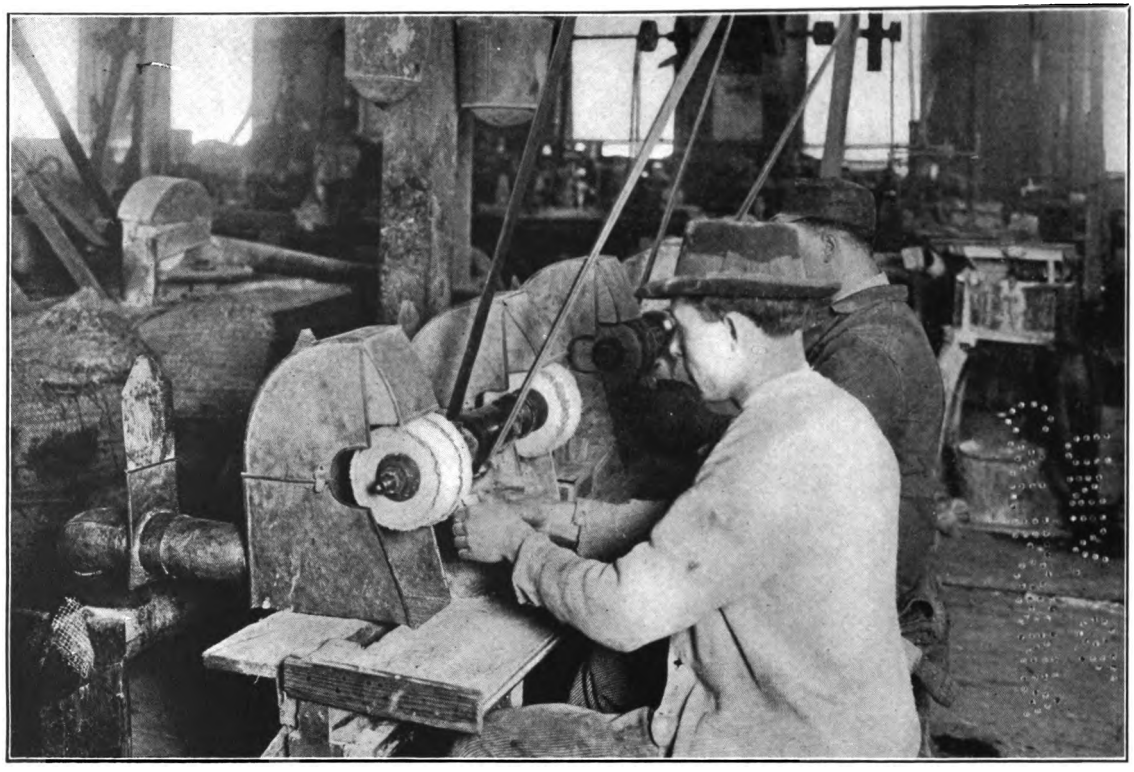
CANS AND BINS—Metal cans for sweepings, self-closing cans for oily waste, metal-lined bins for excelsior, are all subjects calling for specific investigation and report, with a view of reducing the fire hazards to the lowest possible minimum.

FIRE ALARM SYSTEM—Under the heading of "Fire Protection," the inspector determines if the building is subject to the law requiring the installation of a fire alarm system. If said system has already been installed, the date is reported; also whether approved; and if it is (at the time of inspection) in good operating order.

FIRE PROTECTION—The building is covered as to the installation of an automatic sprinkler system, hand grenades, fire extinguishers, water pails, sand pails, stand pipes and hose, and a description of the water supply in general.

PUBLIC FIRE DEPARTMENT—If the factory is connected to the public fire department by a fire alarm box, or to the central

Digitized by Google



Buffing Wheels used in the Pearl Industry. Equipped with mechanical exhaust dust control hoods.

Digitized by Google

UNIV. OF
CALIFORNIA

Digitized by Google

office of a fire alarm company, this information is scheduled on the inspection sheet.

FACTORY FIRE BRIGADE—If the organization of a factory fire brigade has been effected, a statement is required as to its efficiency, and to the number of men in such a corps.

FIRE DRILLS—If fire drills of the operatives are held, this fact is reported; also a statement as to the date of the last drill, and the time necessary to vacate the building.

FACTORY CHIEF—When a Factory Chief has been appointed, it is the duty of the inspector to so advise, specifying by name the individual so appointed.

REPORT ON FIRE HAZARD—The inspector determines by a survey whether or not he considers the building extremely hazardous, and his decision in this regard is reported in accordance with the conditions which he finds prevailing when making the inspection.

SANITATION—Under the heading of "Sanitation," the total number of seats in the water closets is specified, noting the number for each sex; advising where such toilets are located; their condition; if same are utilized separately for the sexes; if the approaches are screened; if outside ventilation is provided; and if a vestibule entrance is provided with outside ventilation.

WASHING FACILITIES—A record is made as to the washing facilities, noting if hot and cold water is furnished; also advising if towels, soap, etc., are provided.

WOMEN'S DRESSING ROOMS AND DINING ROOMS—Dressing rooms for women and dining rooms for men and women are subjects calling for investigation and report.

WASHING FACILITIES AND LOCKERS—The fact that cleanliness is essential to prevent certain occupational diseases, prompts the query if employes wash before meals; also if employes eat meals in workrooms; and if separate lockers are provided for working clothes.

RECEPTACLES FOR SPITTING—To minimize the danger incurred by promiscuous spitting on the floor, the inspector investigates to determine if spitting receptacles are provided.

Digitized by Google

PAINTING, WHITEWASHING AND CALCIMINING—Under certain conditions, the sanitary requirements make it necessary to whitewash the factory, and toilet walls should be kept clean by supplying them with a coat of paint or whitewash. If this is essential, it is so noted and reported upon by the inspector. Record is made as to whether water closets are connected to sewer, or if a cesspool is utilized. A summary of the general sanitary conditions is also given.

BOILERS—The protection of machinery is taken care of by noting if the boilers are inspected by insurance companies or other inspectors.

GENERATING POWER—Description of the generating power is noted in conjunction with specific advices as to the safeguarding of engines; the fact is also determined by what method power is distributed, viz., line shafting or direct motor drive.

PROTECTION OF MACHINERY—Under the heading "Guarding," it is the inspector's duty to report the hazards of shafting, belting, pulleys, gears, projecting set screws, and projecting shafts. A statement is made as to time that shafting is oiled; if scaffolding or overhead runways are protected; by what method shafting can be stopped in case of accident; and if a belt shifter is applied to each machine.

AISLE WIDTH—The width of aisles between machines is measured and noted.

SPECIAL MACHINERY PROTECTION—If power presses, circular saws, band saws, jointers, roll machinery, or emery wheels are utilized, it is the inspector's duty to advise how these respective machines, or any other special machines, are guarded.

EMERY WHEELS—Where emery wheels are used, or chipping operations are conducted, the inspector determines and reports as to the necessity for goggles to prevent accident to the eyes of the operatives.

SEWING MACHINES—Where sewing machines are used, the inspector reports if the shafting on the machines is properly guarded. If hydro-extractors are used, the inspector reports if same are properly protected by covers.

Digitized by Google

ELECTRICAL PROTECTION—Motors, switchboards, and other electrical devices are inspected with a view of determining as to the hazard involved, and so reported.

OCCUPATIONAL DISEASE—If lead is used in the manufacturing process, and if there is any danger from lead, arsenic, phosphorus or mercury poisoning, or from anthrax, record is made of the existing conditions.

COMPRESSED AIR—If under certain conditions there is any danger from compressed air illness, the facts revealed by investigation are reported.

STAIR TREADS—The condition of stair treads, the approximate angle of the stairs, and the condition of the floors relative to accident hazard, is subject to a specific survey.

ELEVATORS—Elevators are inspected to assure that they comply with Chapter 183 of the Laws of 1913. Elevator shafts and doors opening to hoistways, and other floor openings, are inspected to assure provisions from accident and fire.

MECHANICAL EXHAUST FOR VENTILATION—DUST, STEAM, FUMES, EXCESSIVE HEAT, GRINDING AND POLISHING—Ventilation is a subject of special investigation; and a report is called for as to the elimination of dust, steam, fumes and excessive heat emitted; as well as grinding and polishing processes; and the condition of such exhaust systems as are provided for the purpose of removing such dangerous features. These are all reported on in an effort to minimize the possibility of tubercular trouble, and to control other occupational diseases.

AIR SPACE—If sufficient air space is provided, and if the general conditions affecting ventilation are subject to approval, the inspector so reports.

REMARKS—Under the heading of "Remarks," the inspector notes general conditions, and space is also provided for such recommendations as will assure the factory operatives healthful, sanitary and safe working environment. The inspection sheet is forwarded to the Trenton office by the inspector, checked, and referred to the Order Department.

Digitized by Google

The Order Department carefully tabulates the respective recommendations of the inspector, and issues the order to cover the protective features made mandatory by statute, and a definite time is allotted to the manufacturer or owner of the factory premises to comply with the Department's requirements; and the Order is either mailed to them, or referred to the inspector for personal service. One carbon copy of the order is filed in the folder containing all subjects which refer to each respective establishment; this method serving to keep all correspondence separate and intact. Another carbon copy of the order is filed in and under a systematized dating file, which, at the expiration of the period permitted for the performance of the work, automatically brings the order to the attention of the Order Department. By this method a comprehensive follow-up system of each order is attained.

ORDERS BASED ON INSPECTION-SURVEYS

FIRE HAZARDS—As has been pointed out in the report of the Structural Bureau, it is cause for satisfaction that there has been a marked decrease in the number of factory fires for the year 1915, as contrasted with the record for the preceding year. The Department feels that this is undoubtedly due to the more efficient organization of factory fire brigades, and to the increasing interest in all matters connected with fire prevention, not only upon the part of the employers, but of the employes as well.

The results of the campaign of education carried on by the Department, based on specific instructions, drilling, and posting directions, has brought home to workers (in institutions offering special fire hazards) the necessity for co-operation in efforts to prevent repetition of such fatalities as have recently occurred in various sections of the country. The files of the Department show the issuance of 1,263 orders covering the elimination of various fire hazards, dealing with the accumulation of waste and rubbish on factory floors; providing of fire pails and fire extinguishers; hose conditions; keeping fire exits and escapes free from all obstructions; providing metal shields around all coal stoves, and similar details of factory shop discipline.

It is also gratifying to note that by the co-operation of the employers with the Department's efforts, there has been an economic benefit to the entire State.

Digitized by Google

FIRE-PROOFING OF DOORS AND WINDOWS—Experience has demonstrated beyond a question of doubt that exterior fire escapes, while commonly absolutely essential to the safety of the operatives, may be rendered practically useless in case of emergency by lack of proper fire-proofing of the doors used as a means of egress, and of windows facing on and under the escapes. It has been proved that any type of fire escape which is protected by fire-proof windows and doors at all openings beneath, on, or opposite any portion of the escape, will enable the escape in question to be used at all times independent of the smoke and fire hazards that may exist in the building. Another advantage resulting from the fire-proofing of such openings is that the escape may be used for fire fighting purposes, either by public fire departments or by local fire brigades in the event of necessity. This use of the fire escape for other purposes than for mere egress, has been of the greatest advantage in some recent fires; and even where the interior of the building has been completely gutted, fire escapes and fire-proofing of doors and windows have remained intact. The cost of fire-proofing of all openings in connection with fire escapes has been greatly reduced during the last two years, as a result of the standard adopted by the Department and issued in detail on blue prints outlining the best methods of fire-proofing. These cover the essential features of pivoted sashes provided with the standard hardware adopted by the Department (and approved by the National Board of Fire Underwriters); and also include fusible links which in case of fire allow the windows to close automatically. The value of self-closing windows has been demonstrated, and operatives have been able to use fire escapes in safety while the building was a mass of flames.

In order to insure additional safeguards of this character, 402 special fire-proofing orders were issued by the Structural Bureau. To maintain the standard of efficiency attained by the Department during the past years in erecting approved types of fire escapes (on factories of two stories or over) it was deemed expedient to issue 330 orders during the current year.

It might also be noted that of the 1,431 structural changes ordered, a large percentage dealt with means of egress, with a view of lessening fire hazards.

ELECTRICAL FIRE ALARM SYSTEMS, FIRE BRIGADES AND FIRE DRILLS—In the estimation of the Department, the mechani-

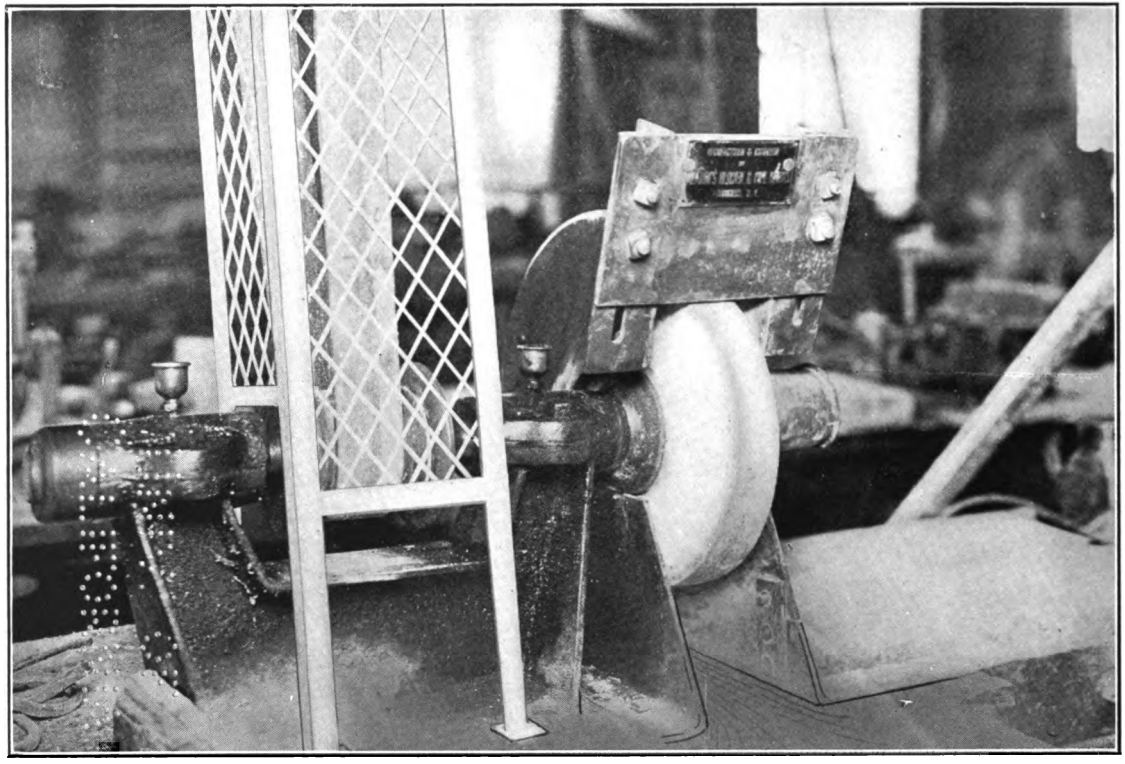
Digitized by Google

cal essentials of fire escapes, and adequate fire-proofing, are largely dependent for their effectiveness on the co-operation of the "Human Factor" in factory discipline. The importance of our electrical fire alarm system (which has been accepted as standard by the signaling committee of the National Fire Protection Association) rests with efficient co-ordination of the fire drill and organized fire brigades. During the past year 190 orders for the installation of electrical fire alarm systems were issued by the Electrical Bureau; but the fact that 740 inspections were made by the Bureau shows the importance placed by the Department on the technical details of this branch of the work.

The reports of the Department for previous years have called attention to the value it places upon the Factory Chief movement, especially inaugurated with a view of fire prevention and protection, and the conservation of human life. Although this movement has spread beyond the original limits into the field of safeguarding and accident prevention, it is still primarily valuable for its instruction to factory employes as to their personal responsibility for the elimination of fire hazards. The orders of the Department during the past year for the inauguration of 258 fire drills (in addition to those already listed) and the organization of 28 new fire brigades, is a gratifying result of the continued co-operation between the Department and those workers whom we are called upon to protect.

SAFEGUARDING OF MACHINERY—During the past five years the old type of blanket order, covering the safeguarding of transmission machinery, has been given place among insurance companies and departments of labor to more technical standardized requirements. The files of the Department for 1915 show 3,808 specific orders based on the technical requirements necessitated by the regular and special types of machinery. These orders are all in conformity with the standard specifications for safeguarding of transmission machinery, given in detail in the earlier pages of this report. This substitution of specific for general orders for safeguarding necessitates detailed work, which is an ultimate advantage not only from the safety point of view, but from the economic. Any manufacturer receiving and complying with this type of order, makes improvements permanent in character, and thereby guarantees an industrial working condition advantageous

Digitized by Google



Grinding Wheel used in the Pearl Button Industry. Equipped with combination protection and dust hood. The hood is of steel construction and protects the worker from injury in case of wheel bursting.

Digitized by Google

Digitized by Google

from the standpoint of insurance, as well as one minimizing the hazard from accident. Probably no feature of the Department's work during the past year has met with more general approval from the manufacturing interests of the State than this standardization of guaranteed protective devices.

GENERAL SANITATION—Great stress has been laid on the work relating to the betterment of sanitary conditions affecting factory operatives. A rigid enforcement of the Department's standards concerning toilets (including sewer connections) light, ventilation, vestibule approaches and separation of sexes, have been covered by a large proportion of the 1,796 orders on sanitary conditions issued by the Department. In addition, plans were passed upon in approval of sanitary provisons in new factories to be erected. The records of 1915 concerning the installation of washing, dressing and lunch rooms are especially gratifying, in that they show a spirit of co-operation on the part of the employers in fulfilling the requirements summarized in the orders issued. There is a general recognition of the fact that (aside from safeguarding of machinery) nothing concerning factory conditions more vitally affects the health of the worker, or is more inducive of efficiency, than good washing facilities. The Department has standardized types of installations which give the most satisfactory returns for the minimum of capital invested, and the question of a supply of pure drinking water, preferably bubbling fountains, is also meeting with wide acceptance among the employers of the State.

ALTERATION TO ELEVATORS—It is cause for gratification that the enforcement of the factory law pertaining to elevators has led to an enormous reduction in elevator hazards. During the current year, 431 orders for alterations in conformity with the law of 1913 were issued, in addition to the standardization of elevator construction in a number of new factory buildings. The general reports of inspectors show satisfactory observance of these safety requirements throughout the State.

VENTILATION AND THE ELIMINATION OF DUST AND FUMES —The Department regards the standardization of mechanical exhaust ventilation one of the most important features of this work; not only from a standpoint of the employee, but also from that of

Digitized by Google

the manufacturing interests of the State. There are few industries that, either from the nature of the material handled, or necessary working conditions, are not obliged to meet problems of dust and fume removal, which are of vital concern from a social and economic point of view. The fact that the Department's orders covering these items are usually composite (being issued in the form of blanket orders), together with their infinite number of details, makes it difficult to give an adequate idea of the volume of work handled by the inspectors and experts for the year 1915. In the estimation of the Department, and of authorities conversant with the work accomplished, the past twelve months has demonstrated the efficiency of the scientific methods adopted for handling an extraordinary range of industrial hazards. The Department confidently believes that it has passed beyond the period of experimentation, and that it has successfully met the removal of practically every type of dust and fume, which involves subjection to occupational disease hazard on the part of employes throughout the State. Reference has already been made to noteworthy achievements in the felt hatting industry. The requirements of the Department as to the type of installation and fan power for both fume and dust are being widely adopted in other states.

In the 374 blanket orders issued for general ventilation, and for removal of dust and fume, several thousand specific details are included, covering the installation of exhaust systems on grinding, polishing and buffing wheels, and on woodworking machinery. And special installations of batteries of mechanical exhaust systems for the elimination of various industrial dusts, fumes, steam, gases and excessive heat.

EMPLOYES—Under this division, 1673 orders were issued covering direct benefits to factory operatives. These include the co-operative jurisdiction affecting minors under sixteen years of age, their excess hours and age and Schooling Certificates; not permitting minors to operate about moving machinery; providing registers showing the legal hours of employment of said minors; regulating the hours of women; also providing registers showing the number of hours that women work; lighting conditions affecting factory employes; and the posting of essential signs (of which approximately 25,000 have been forwarded in 1915); and

Digitized by Google

also the provision for installing "First Aid" kits in specific factory buildings.

CLERICAL STAFF

Steam Engine and Boiler Operators' License Bureau, three stenographers.

Employers' Liability Commission, one secretary, one statistician and one clerk.

Structural Bureau, one clerk.

Electrical Bureau, one clerk.

Child Labor Bureau, one clerk.

Bake Shop and Mercantile Bureau, one clerk.

Department of Hygiene, Sanitation and Standardization of Machinery Guarding, one clerk.

General Office Administration, one clerk, one stenographer, one order department clerk and one filing clerk.

By systematized co-operation these several sub-divisions tend to co-ordinate the work of this Department.

Some idea of the volume of correspondence handled by the above force, due to inquiries, reports, answers to letters, issuance of plans and blue prints, sending out of notices, orders, etc., etc., may be gained from the statement that of the Department's annual appropriation the sum of $2,773.05 was expended for necessary postage, and $2,866.06 for stationery and printing.

DISTRIBUTING AND REFERENCE SYSTEM

Experience has shown the value of a clearly defined district system, in which territories do not overlap, and where the responsibility of the inspector in reference to a given plant can be fixexd without delay.

During the current year, the Engineer of the Structural Bureau has re-surveyed the district maps of the Department, verifying all boundary lines; relisting the number of factories in each city or town; ascertaining the heights of the buildings listed, and number of employes. Maps or charts have been prepared, showing these exact boundary lines, and they are so arranged that by placing the different districts alongside of each other, the entire State of New Jersey will be shown. Each map is marked so that the adjoining district can be easily noted. Only the cities and towns that contain factory buildings, or manufacturing plants, are shown on the maps, as well as the location of mines. The railroads running through or near a manufacturing city or town are also shown.

One of the features of this map system is that it can be changed at any time; new cities or towns can be added or eliminated as they contain, or cease to contain, manufacturing plants. The

Digitized by Google

maps are in blue print form, and compose a booklet of eleven pages. These booklets enable inspectors to know their exact boundary lines; also to be familiar with the boundary lines of every district in the State. Each district has been given a title, which indicates the principal industry carried on. They are as follows:

District No. 1.....Southern and Glass Manufacturing District.
District No. 2.....Cannery and Shoe Manufacturing District.
District No. 3.....Shore District.
District No. 4.....Pottery and Headquarter District.
District No. 5.....General Manufacturing and Central District.
District No. 6.....Mining and Northern District.
District No. 7.....General Manufacturing, Mercantile and Laundry District.
District No. 8.....General Manufacturing and Jewelry District.
District No. 9.....General Manufacturing, Machinery and Printing District.
District No. 10.....Chemical and General Manufacturing District.
District No. 11.....Embroidery Manufacturing and Hudson River District.
District No. 12.....Silk Manufacturing District.

This system of outlining districts can also be extended so as to show all bakeries and mercantile establishments.

In connection with each manufacturing place shown on the map, a tabulated chart has been prepared outlining exactly the number of factories in each place; the number of firms in each building; the height of the building; and the number of people employed in each building.

An effort has been made by the Department in its annual report to set forth the varied and serious obligations which it is compelled to assume by the statutory requirements of the State. The obligations which are placed upon each member of the force are of a nature which should inspire a full measure of devotion, for their joint efforts add to the safety, health, and comfort of nearly one-half million of the workers of the State.

It is only fitting that I should pay tribute to the broad-minded spirit shown by the employers of the State who have been required to expend large sums of money in order to carry out the specific requirements of the law, and the supplemental regulations of the Department. In practically all cases they have been willing to furnish the improvements desired, when they have been convinced that the changes would better the working conditions of their operatives. In New Jersey, the manufacturer who opposes the modern viewpoint of regulated industry, when the real situation is thoroughly understood, is a decided exception.

In closing this report, I wish to take occasion to express my sincere appreciation of the splendid spirit of co-operation and loyalty to their several duties of each and every associate in the

Digitized by Google

Department. It has been my effort to impress upon the mind of each one associated with our work, the fact that his compensation is not to be measured merely in the salary paid, but rather that he should take both pleasure and satisfaction in the fact that he has been part of an organization whose activities have been of inestimable value to a large number of the men, women and children whose working conditions have been made more safe, healthful, and comfortable by reason of his devotion to duty.

In closing, I wish also to impress upon the minds of the public the fact that the State has no more sacred obligation than the enactment and enforcement of such regulations as are calculated to conserve in the highest degree our most valued asset—the men and women who compose the industrial army which is the back-bone of the commonwealth. It is to be hoped that the greatest moral encouragement may be extended by the community in general to all those interested in the conservation of the human factor; and that the Legislature may realize the wisdom of providing appropriations sufficient to greatly enlarge and strengthen the activities of the Department.

Yours respectfully,

LEWIS T. BRYANT,

Commissioner of Labor.

Digitized by Google

Digitized by Google

INDEX TO SUBJECTS

	Page.
Accidents	60
Alterations to Buildings	12-14
Blower Law	50
Bulletins	5
Bakeries	14-58
Child Labor	53
Clerical Staff	75
Cork Dust	35
Electrical Bureau	10-71
Elevators	15-73
Employers Liability	60
Exhaust Installations	51
Fire Protection	5-6
Fire Brigades	7
Fire Drills	6
Fire Proofing	6
Fire Escapes	5-14
Factory Chiefs	7
Flint Dust	41
Factory Standards	37
Hazardous Trades	22
Hygiene and Sanitation	21
Hotels and Public Buildings	10
Inspection	62
Information	13
Inspection Districts	76
Lead Risks	25
Linoleum	34
Lithograph Transfer	48
Mines	59
Mercantile Work	57
Machinery	72
Museum of Safety	9
New Buildings	14
Occupational Diseases	22
Office System	61
Pearl Buttons	44
Potteries	36
Porcelain	40
Quarries	59
Sanitation	73

Digitized by Google

	Page.
Steam Engineers License	51
Safeguarding Machinery	72
Safeguards for Machinery	16
Safety Hoods	46
Structural Bureau	11
Standards	9
Toilets	15
Tuberculosis	21
Tuberculosis, Mortality from	23
Transmission Machinery	5
Women, Protection of	56
Workmen's Compensation	60

Digitized by Google

Digitized by Google

RETURN TO the circulation desk of any University of California Library

or to the

NORTHERN REGIONAL LIBRARY FACILITY
University of California
Richmond Field Station, Bldg. 400
1301 South 46th Street
Richmond, CA 94804-4698

ALL BOOKS MAY BE RECALLED AFTER 7 DAYS
To renew or recharge your library materials, you may contact NRLF 4 days prior to due date at (510) 642-6233

DUE AS STAMPED BELOW

FEB 28 2008

DD20 12M 7-06

FORM NO. DD 7, 8m, 6'76

UNIVERSITY OF CALIFORNIA, BERKELEY
BERKELEY, CA 94720

P1

Digitized by Google

U.C. BERKELEY
C006951

734921

HD8053
N5A4
1914/15

UNIVERSITY OF CALIFORNIA LIBRARY

Digitized by Google

Digitized by Google